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## KEY TO ABBREVIATIONS

B R. — Book Review	Misc — Miscellany
C — Correspondence	N — Notice
C R. — Case Record	N E S S — New England Surgical Society
E. — Editorial	N E U A — New England Branch of the American Urological Association
M M S — Massachusetts Medical Society	N H M S — New Hampshire Medical Society
M T L. — Massachusetts Tuberculosis League	O — Obituary
M P — Medical Progress	Or — Original Article
M R. — Meeting Report	V S M S — Vermont State Medical Society

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## THE TEACHING OF THE MEDICOSOCIAL ASPECTS OF CASES\*

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BOSTON

THE older generation of today remember their early family doctor for his kindly manner, cheerfulness, understanding, sympathy and practical advice. They now realize that his knowledge of medicine was inadequate as judged by modern standards, but in retrospect at least, this seems relatively unimportant to them. His medical education was chiefly along practical lines, and if he was one of the more venerable men of that day, it had been acquired aside from the study of anatomy, largely if not entirely through daily association with some older physician, in his buggy making visits, and in the hospital.

The age of Bernard, Virchow, Pasteur and Lister saw the dawn of modern research in clinical medicine, and the beginnings of applied science in its teaching. As a result, pathology, bacteriology, physiology and biological chemistry have been added to the older study of anatomy, and now form the basis of medical education. If considered in the light of advancement of knowledge this change has been altogether desirable, and its value has been unquestionably shown in new and improved methods of diagnosis, treatment and prevention of disease.

But the *practice* of medicine includes much more than an attempt to control disease by scientific methods. Eighty years ago James Jackson<sup>1</sup> in his *Letters to a Young Physician*, said

From this day you must realize more and more the difference between the study of the sciences and the application of them to the business of life,—to the practice of your art. First, because many principles, on which we act, are not established on certain ground and therefore they must be followed with great caution and constant watchfulness. Second, because there are few principles which are universal in their application.

Later in the same letter he compares the art of medicine to that of navigation.

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In the practice of each of these arts we avail ourselves of the laws of nature to produce certain results. The seaman places his ship upon the waters, and avails himself of the winds to propel it. These winds are uncertain, they are not, in any way, subject to his control, so that he cannot be sure as to the duration, the comfort, or even the safety of the voyage, he cannot furnish a pupil with positive rules by which to conduct his bark across the Atlantic. The Captain must have regard to the qualities of his ship, the strength of his crew, and to the constantly varying circumstances of the weather. The complexity here is much less than attending the treatment of a disease, for in this we have to do with a living being.

Medicine is not, and never will be, an "exact science" which can be practiced by the precise methods of reasoning and deduction of the mathematician, the chemist or the physicist. The reaction, both mental and physical, of the human being to any external or internal factor is an ever-present variable which prevents the accurate and unfailing relation between cause and effect that characterizes the work of the true scientist. The engineer who wishes to construct a bridge that is to support a given weight can, through his knowledge of the strength of its component parts, prophesy with considerable accuracy the strength of the whole structure. The chemist can foretell the reaction that must result when two compounds are brought together under given conditions. But where living organisms are involved individual variation precludes any such exactitude, and in medicine the innumerable social, economic, psychiatric and physical elements of each situation make this variation an ever-changing factor in the reaction of the human being at various times in his life and even during the course of a brief illness.

Henderson,<sup>2</sup> in his most absorbing interpretation of Pareto's *General Sociology* points out that many of the subjects taught in our universities may be divided into two classes: first, history, literature, economics, sociology, law, politics, theology, education, and so forth; second, logic, mathematics, physics, biology and other natural sciences gram-

mar, harmony, and so forth. He states that when the authorities on the latter group of studies disagree it is "most often at the frontiers of knowledge, where growth is taking place, and in the long run a debated question is ordinarily settled by observation, experiment, or some other method that all accept"—in other words, by the methods applicable to any true science. This, Henderson tells us, is not in general true of subjects of the first class, because "all of the subjects of the first class do involve, and no one of the subjects of second class does involve, the study of the interrelations of two or more persons."

If we attempt to place the study of medicine in one of these classes we at once see that it must be divided into its component parts. The basic sciences such as anatomy, physiology, chemistry and so forth unquestionably fall into the second group, but the *care of the patient* indubitably belongs in the first class, for one cannot treat the patient without regard to his social environment, and two or more people are involved.

A tendency to focus the emphasis in the modern teaching of medicine on the physical and laboratory approach to diagnosis, treatment and prevention of disease is liable to obscure the importance of those methods and qualities which enabled the old-fashioned family doctor not only to bring happiness, solace and mental tranquillity to his patients, but also, by his knowledge of them as individuals and as human beings, to discover and evaluate factors bearing a significant relation to their illnesses which would not have been revealed by the most complete modern laboratory studies or by the usual routine history and physical examination of today.

The clinical aspects of medicine are now taught principally in the public wards and outpatient departments of hospitals. This is necessarily so, and from the point of view of the study of disease the public hospital with its wealth of available clinical material is the best place for such teaching. But the difficulty is that in these surroundings the patient is likely to be stripped of his personality, his human relationships and the complexities of his own particular life and environment. The student, the intern and even the instructor tend to speak of him as a "case of gastric ulcer," for example, and to forget that he is a human being. As a result, they fail properly to investigate and consider the economic, occupational social and psychological problems that he is facing, and that may have a direct or indirect bearing on the etiology and treatment of his illness.

Moreover, there is still a tendency to speak of all symptoms as either *functional* or *organic* and to

base their treatment upon this arbitrary method of classification. It is generally recognized that symptoms arise when some organ has a lesion and therefore functions abnormally. It seems to be realized by but few physicians that environmental factors often cause dysfunction of an organ or organs, and that dysfunction may result in a lesion. Yet there is much evidence that anxiety and nervousness may lead to gastric hyperacidity and eventually to gastric ulcer,<sup>3</sup> that exacerbations of arthritis frequently follow prolonged periods of mental or physical overactivity<sup>4</sup> and that arterial hypertension is found with significant frequency in the tense high-pressure type of individual.<sup>5</sup> Cobb<sup>3</sup> points out that certain diseases, such as paralysis agitans, formerly classified as functional are now known to show definite pathologic (cellular) changes, and are therefore organic. He prophesies that new or improved methods of investigation will demonstrate that other so-called functional ailments have pathologic changes and will be accepted as organic. These terms, therefore, are but arbitrary divisions of an indivisible field and should be avoided. Rather than attempt such a differentiation we should devote our attention to a consideration of the etiologic relation of environmental factors, symptomatology and physical and laboratory evidence of disordered function of the body as an organism, and realize that anything which happens to that organism is organic.

Frequently in a hospital the study of the environmental factors of the "case" is delegated to the social service department, but all too often it is entirely disregarded. Moreover, the function of the social worker is to act as a consultant who considers one particular portion of the patient's problem and renders an opinion on it to the physician in charge. One would scarcely expect the roentgenologist to make his studies of a patient without reporting his results to the physician, much less would one expect him to institute such treatment as seemed to him advisable without consulting the physician. Yet this is often the attitude taken toward the social worker. A summary of the social-service investigation and the recommendations resulting from it should be incorporated in the patient's record as routinely as are consultations from medical specialists such as the aurist, the roentgenologist and the gynecologist. It is in this way only that the various aspects of the patient's problem can be properly integrated by the physician in charge, yet it is seldom done.

The result of this basic defect in the hospital routine—this lack of proper liaison between the physician and the social worker—is further to hide from the student and the house officer the

importance of considering the social aspects of each case before drawing final conclusions as to its correct diagnosis and proper management. The individual whose medical experience has been confined to the study and care of the patients within the walls of a hospital, be he student, intern or visiting physician, is prone to look on the work of the social-service department largely as a charitable endeavor to better the lot of poor and uneducated patients. He thinks of social problems as being almost exclusively the result of financial distress. This is of course entirely erroneous, as similar and often more complex social problems arise in cases among the well-to-do. Aside from the assistance which the social workers give in arranging for the disposal of patients with chronic or incurable diseases, he sees very little correlation between their activities and his own. The student is not interested in the medicosocial aspects of the cases, chiefly because he does not appreciate their important relation to the etiology of symptoms, the practice of medicine and the prevention of illness.

The foregoing criticisms should not be construed as implying that attempts to teach the medicosocial approach to medical problems have not been made in the past, or are not included in the present curriculums of many medical schools. Edsall in 1912 introduced such teaching of students at the Massachusetts General Hospital.<sup>6</sup> Minot<sup>7, 8</sup> has stressed its value for many years. Many psychiatrists have been emphasizing its importance as a therapeutic procedure for a quarter of a century. And in the last few years instructors at various medical schools and in many fields of medical education—internists, psychiatrists, pediatricians, surgeons, teachers of preventive medicine, public health, and hygiene and social workers—have given lectures or special courses to medical students on this aspect of medicine. But despite these attempts of individuals, the fact remains that the social approach to the study of medical cases has received insufficient emphasis as a whole in the education of medical students, and has been totally neglected by many clinical instructors. The need is to permeate the entire curriculum with such teaching, rather than to confine it to any single department or teacher.

#### OBJECTIVES

It would therefore seem most desirable to bring about a change in the usual approach to the clinical teaching of medicine. We should attempt to develop in our students a greater interest in the patient as a human being, and should therefore avoid discussing his problems largely as phenomena of diseased organs or disordered function.

We should adopt a more humane rather than a purely material attitude toward the problem of the individual. We should return to a greater emphasis on the *health* and *happiness* of the patient as the primary aim of medical practice, but not at the expense of minimizing the importance of the control or cure of disease. In all contacts with students we should keep in mind the following objectives to develop in their minds a consciousness of the importance of the social aspects of medicine to the practice of their art, to bring to them a realization of their responsibilities as physicians, not only to the patient, but to his family, the community and humanity, to teach them how to elicit and evaluate in scientific fashion the social factors of the individual case, and to demonstrate how to construct a plan of treatment that is socially as well as medically adequate and applicable to the peculiar circumstances of the individual patient.

#### *Importance of Social Aspects*

The value of social study in diagnosis, the essential part that it plays in determining the exact treatment of the case and its role in the prevention of disease and of psychological maladjustments, both for the patient and for his associates in life, must be demonstrated to the student. He must be made to see clearly that this is an integral part of medicine itself, not merely an allied field of social endeavor. He must be reminded of the historical fact that social-service departments were created in public hospitals because this aspect of the cases of indigent patients was of necessity being neglected by busy physicians, but that these departments represent merely a dissemination of the function of the physician. The study and evaluation of the social component of each medical problem is, moreover, a duty which the physician has to assume unaided in dealing with his private patients. If the student can be made to realize this fully, he will be much more willing to learn the technic of social study and of its application.

#### *Realization of Responsibilities*

In discussions of the social aspects of medicine with students one is frequently asked such questions as these: Is it the physician's duty to go into family affairs so remotely connected with the patient's disease?<sup>1</sup> Does not his responsibility end with the treatment of that disease, or at most of the patient himself?<sup>2</sup> Does not this belong to the field of preventive medicine, or psychiatry, or a social-welfare agency?<sup>3</sup> In order to answer these questions satisfactorily it is necessary to give the student a panoramic view of the whole field of



medicine At one end of the picture we have the chemist, the bacteriologist and the physiologist, studying problems concerning disease, and working entirely in the laboratory Next comes the trained clinical investigator Near him stands the public-health officer, striving by experimental and practical methods to prevent and control disease in the community In the middle we have the more strictly limited aspects of practice, the specialists who attack the patient's problem from but one point of view They diagnose and treat ailments in their own particular field They have methods and weapons especially adapted to their use—the surgeon's knife, the cardiologist's stethoscope and electrocardiograph, the laryngologist's head-mirror and bronchoscope, and so forth At the other end of the panorama we have the psychoanalyst, who deals exclusively with the abnormalities of intellect and the emotions—the field so stupidly and incorrectly described as functional disorders His work, at the extreme edge of the picture, touches that of the father confessor and spiritual adviser, the philosopher and the sociologist And to him a complete knowledge of the social environment—in the broadest sense of the word—of his patient is essential

But the picture is not divided into clear-cut sections or groups The work of each touches that of all the others Certain of the methods and discoveries of the pure scientist are applicable to each of the specialties Every human being has his own psychological peculiarities And throughout the whole panorama we have the internist, or to use the older and more descriptive term, the general practitioner His functions are many He serves as liaison officer between all the other groups He is the jack-of-all-trades who does the jobs that do not fall directly into the other fields He is himself a specialist in medical ailments He often acts as a clearing house by directing patients to the specialists appropriate to their needs His work carries him from one end of the panorama to the other, and to fulfill his function he must be acquainted with and occasionally take an active role in the work of each group Moreover, every one of these individuals is dealing with human beings, each with his own peculiar life, environment and extramedical problems If we accept the hypothesis that the practice of medicine involves the study of the interrelations of two or more persons, we must admit that each of these workers must consider the social aspects of every case that he cares for The cardiologist has not helped his patient when he advises a sedentary life or "light work" to an individual who has a family to support and whose only means of livelihood is mov-

ing furniture If, through his knowledge of the patient's talents, through the aid of social agencies or by any other means the cardiologist finds or suggests some employment for the patient that is compatible with his physical limitations, he has more fully performed his function as a physician In so doing he has not only aided the patient, but also his family and the community, which would otherwise have been obliged to care for them all Such considerations as these, with simple illustrations from actual cases, should enable us to convince the student of the scope of his responsibility as a physician and his duty to society as well as to the individual He will then see that it is a part of the duty of every physician, whether he be a specialist or not, to act at times as a public-health officer, at others as a psychiatrist, and to try to prevent disease as well as to cure it And he will realize that he must often become involved in social situations apparently remote from his patient's disease in order to assist in the control or cure of that disease

### *The Elicitation and Evaluation of Social Factors*

The term "environment" includes, in its social sense, not only geographical surroundings but social relations,—contacts with other individuals—indeed all the factors which have an influence on the individual's reaction to life Every human being has his own peculiar environment, therefore every medical case has its social aspects The evaluation of the social data in relation to the patient's ailments depends first of all on the physician's ability to elicit the story The student must be made to realize that the usual brief summary of the social, marital, economic and occupational history found in hospital records is entirely inadequate A knowledge of the patient's ambitions, hobbies and interests, of his daily contacts and his reactions to them, should be acquired, and his moods, his thinking processes, his understanding of his illness and his ability to adjust to the handicaps which it imposes should be evaluated The physician must know, in short, the intimate details of the patient's personality and his environment, and in order to acquire this knowledge he must gain the patient's confidence The experienced physician or social worker seldom expects to gain all this data at the first visit, and if the patient is acutely ill little or none of it can be elicited from him Much of the history may be learned from interviews with friends, business associates and members of the family Indeed, even brief conversations with his daily companions may reveal in these individuals themselves factors deeply affecting the patient's psychological environment The wife, in telling you of her

husband's symptoms, may reveal traits of her character that are pertinent to the situation. The manner in which his partner inquires about him over the telephone, or simply the dissolute appearance of the son whom you meet on the stairs or glimpse at a late breakfast, may give significant clues to problems and complexities in the patient's life.

In this study of the environment one is greatly handicapped if the patient is seen only in the physician's office or the hospital. Often, in private practice, it is desirable to seek deliberately an excuse to see the patient in his home surroundings, or to have an interview with him in his business environment. Although this is seldom possible to arrange for the student, its significance should be impressed upon him.

The value of these factors in the treatment of a sick person cannot be overemphasized. I<sup>o</sup> alluded to the importance of their consideration in a communication a few years ago, and much further thought on the subject has only served to strengthen my convictions. In this age of mechanization and laboratory investigation, with its ever-increasing number of tests and diagnostic procedures, we are all too prone to forget the importance of treating the patient as a whole man, as "he" or "she" rather than as a "case."

The mere acquiring of social data is not sufficient. Their evaluation in relation to the patient's illness requires the ability to see his problems from his point of view, rather than to judge of their significance by our own standards. The workingman's tenement may seem squalid to us, but entirely adequate to him. An illness which to us is trivial may fill him with terror and desperation. On the other hand, apparent success in any field of endeavor may be far short of the patient's aims, or his ambition may lie in an entirely different direction. For example

In the case of the youthful president of a large and prosperous business concern, it was learned that he had always wanted to go into a profession, but that he had been forced by family considerations to go into the business in conducting which his father, the former president, had committed a crime and became a fugitive from justice. There was friction and jealousy among his board of directors, all of whom were older men who resented his succeeding his father. As a result, the patient had developed a deep sense of frustration and failure. This, on proper evaluation, proved to be the sole cause of the symptoms which at first seemed to point strongly to the diagnosis of peptic ulcer.

In order to decide what role such factors play in any case we must gain a thorough insight into the patient's reaction to his environment, and not be misled by a few superficial evidences of social, marital or economic prosperity. The eliciting of

the social history demands tact, patience and keen perception. Its evaluation requires imagination, experience and the ability to see the problems through the patient's eyes.

### *Development of a Socially and Medically Adequate Plan of Treatment*

The weakest point in the program of treatment in a public hospital usually develops at the time of the patient's discharge. Prior to then he has been the subject of detailed study and care by experienced clinicians, able clinical investigators and enthusiastic and watchful interns. He has had the benefit of the combined knowledge of many members of the staff of the hospital. But the planning of aftercare and his instruction in it are usually left largely or entirely to a house officer whose medical experience has been limited to hospital work, who has had no opportunity to study the problems of convalescence in the home and whose supervision of patients while at work has been confined to a few months in the outpatient department.

The first step in the planning of aftercare is to give the patient or his family as thorough as possible an understanding of his illness, its resulting limitations, their probable duration and their implications in regard to his future life and activity. Obviously the psychological effect of such information must be considered, and it is frequently advisable to pass much of this information on to relatives rather than to the patient. It must be remembered, however, that the patient is the one who must make the adjustment and carry out the instructions, and that therefore he must be given as complete an understanding of his situation and the reasons for each limitation as is consistent with his psychological welfare and happiness.

An intelligent police officer who had been on the ward for many weeks slowly recuperating from a severe coronary thrombosis was about to be discharged, the intern reported that the patient had been given a thorough understanding of the nature of his condition, its implications and limitations, that he had already arranged to be retired from the police force and that his future course of convalescence had been carefully planned for him. Partly for the purpose of demonstrating to the students the details of such planning and partly to elicit personally the patient's reaction to his limitations, the visiting physician asked the patient what he was going to do when he went home that afternoon. "Put the wife and kids in the back of the car and start for California. We ought to make two hundred miles before dark," was the surprising answer. Further questioning revealed a complete lack of understanding of the situation not only by the patient but by the intern as well. The latter, apparently assuming that all policemen are patrolmen, had informed the patient that his work was not compatible with the degree of cardiac damage he had suffered, that he should resign from the force and spend the next few months sitting

around outdoors' The patient, having been a sergeant attached to police headquarters, whose duties were almost entirely clerical, had interpreted this as implying that his sedentary life had been the cause of his illness, and that an outdoor life was advisable. To his mind driving an automobile eight or ten hours a day was a pleasant way of "sitting around outdoors, and he had been busily mapping out a tour that would include every state in the Union. With proper social planning his retirement was changed to a temporary leave of absence, his convalescence was completed at home, and he was then able to return to his previous duties with only slight modifications. In this case the intern, through lack of attention to detail, had entirely failed to acquire for himself, or to give the patient, an understanding of the medicosocial situation, and had thus allowed the patient to develop for himself a most undesirable program of aftercare. The revelation of his failure did much to make the house officer appreciate the importance of careful instruction to patients on discharge.

Another point to be remembered in drawing up a plan of treatment is that it is often important to consider the health and happiness of the patient rather than the prolongation of his life

An elderly lawyer with hypertension and some anginal pain was told by an enthusiastic young physician that he must give up all use of tobacco and alcohol, retire from business and stop playing golf. The patient, feeling that these orders forbade the very things that made life worth living, decided after mature deliberation to defy them all. He smoked and drank distinctly more than had been his habit, worked harder and played harder. The result, as may be supposed, was severe and frequent attacks of pain, which he tried unsuccessfully to disregard. After a few weeks he consulted another physician, who, without knowing of the previous advice, counseled moderation in all things. 'Continue to have your cigar after lunch and two in the evening, but cut down on the cigarettes that you really don't care for anyway. A highball in the evening will do no harm, but avoid cocktails when you can. At sixty-eight you should try to delegate as much work to others as possible, and take at least two afternoons away from the office each week. If you will give up the next six weeks to getting rested, on a definite regime, you will be able to carry on a fairly normal life afterward. There is only one rule which you must promise to obey. Whenever you have an attack of pain stop whatever you are doing and sit down, even if it is on a curbstone, until the pain goes away. You are going to be able to enjoy a good many more years if you will take reasonable care of yourself. The patient joyfully accepted this regime, and today at the age of eighty-four is alive, happy and in reasonably good health.

Finally, it is often more important for the plan of treatment to be practical for the patient and his family, and compatible with his financial and occupational resources, than for it to be the ideal therapy for his disease. The office worker may be unable or unwilling to take milk and cream every hour, but can perhaps arrange for a bland diet, regular meal hours and repeated brief periods of relaxation, which are often quite as effective in the treatment of peptic ulcer. A wage-earner with diabetes may not be able to give up

time to enter a hospital for regulation of his disease, or be willing or able to weigh his food, but such individuals can, more frequently than is often realized, be treated successfully while at work, and can learn to estimate the composition of food intake with sufficient accuracy to permit satisfactory insulin therapy.

## METHODS

A study of the methods of teaching of the social component of medicine that have been employed, or are now in use throughout this country, reveals wide variations in both the character of the teaching personnel and the approach to the subject. The instruction is conducted by many different departments of the various medical schools, and in some by social workers without the aid of physicians. It is attempted variously by lectures, medicosocial ward rounds, case studies, case presentations, conferences and in some instances visits to the home. It seems obvious that one should not attempt to decide which of these means to a common end is the best. Each has its own advantages, and in all probability all are largely successful in accomplishing their purpose. The type of individual available for such teaching in each medical school and hospital will govern the selection of instructors, and the method of teaching will depend on the peculiar abilities of the individual and the exigencies of the situation at that particular medical center. The essential thing is to present to the student the medical approach to his cases in the most effective way that is possible.

Much deliberation on the various methods employed in other clinics, together with personal experiences at the Harvard Medical School unit of the Boston City Hospital, has, however, led to the formation of certain general conclusions.

That the teaching of the medicosocial aspects of cases is most effective if conducted by a physician rather than by a social worker alone.

That the function of the social worker in such teaching should be subsidiary to, though in close association with, that of the clinician.

That the case method of presentation, whether on ward rounds, in outpatient departments or in conference, is more suited to this teaching than didactic lectures alone.

That the subject should not be introduced as a separate entity, but in close correlation with the purely medical aspects of a disease or a case.

That the ultimate aim is to have such teaching permeate the whole medical curriculum, in all discussions with students that deal with diagnosis, prognosis and the treatment and prevention of illness.

## SUMMARY

The need for the teaching of the medicosocial aspects of cases is emphasized, the objectives of such teaching are outlined and discussed, and cer-

tain general conclusions as to the methods of teaching are presented

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## THYROID SURGERY AT A LARGE MUNICIPAL HOSPITAL\*

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THIS report covers a series of 559 consecutive cases of thyroid disease treated surgically at the Boston City Hospital from 1925 to 1937, inclusive. Many patients entering a municipal hospital are at the end of their physical and economic rope. Because of this, and because of administrative problems not encountered in private institutions, special measures must be adopted in order to obtain satisfactory results. During the years covered by this series, no patient has been denied his chance for health by operation.

Prior to 1925 only occasional thyroid operations were done in the hospital. Because of unstandardized treatment many of the results were unsatisfactory, and the belief arose that thyroid surgery in this type of hospital was unsafe. Encouraged by two of our medical colleagues, Dr. Burton E. Hamilton and Dr. W. Richard Ohler, we began an attempt to organize thyroid surgery in the hospital.

In the beginning, thyroid cases were not assigned to me, but were obtained because of a demonstrated interest in them. The early cases were mostly poor risks and the mortality was high. Iodine had not been long in use, and frequent multiple-stage operations were necessary. Many patients refused operation. The interns were entirely inexperienced in the operative technic and postoperative care of thyroid patients. Patients were in thirty-bed wards and there was no way of isolating them. At this period the hospital itself was in the process of reconstruction. Wards were being torn down and new buildings being erected. The machine-gun rattle of pneumatic riveters did not make for a satisfactory convalescence. An anesthesia service did not exist. Each new anesthetist had to acquire experience with thyroid patients, and the apparatus then in use was difficult to manage.

After a time we were able to demonstrate the

wisdom of assigning these patients to one surgeon. The staff generously did so on the basis of an annual assignment and subsequently made this permanent. The number of patients has steadily increased. The assignment of cases to one surgical service has meant a sacrifice by the other members of the staff, but it has benefited the patients. If the cases were rotated, in a staff of forty members no one surgeon could acquire enough experience to justify his doing thyroid operations. The new system has also made possible a thorough training of one group of interns, and operating is now being done by other surgeons on the service.

In 1932 a Thyroid Clinic was established in the Out-Patient Department. This is a diagnostic and follow-up clinic open one day a week. Its personnel includes both physicians and surgeons. It has been a very valuable part of the organization. In 1933 the Trustees made it possible to isolate female patients in semi-private rooms. Men had to be cared for in a large ward until 1938, when the opening of the new Dowling Building did away with this difficulty.

#### PREOPERATIVE CARE

Very few thyroid patients are admitted directly to the Second Surgical Service. Admissions to the hospital are either from the Out-Patient Department, in which case they have been studied in the Thyroid Clinic, or from the patient's family physician. Only non-toxic patients are referred directly from the Thyroid Clinic to the surgical service. All other thyroid patients are admitted to a medical ward for preliminary study, and soon after admission the surgeon is requested to see the patient in consultation. Meantime the patient is at rest, and study of the metabolic rate and blood chemistry is being done and existing complications, if any, are being treated. This preliminary survey by the surgeon is extremely valuable. It enables him to estimate more correctly the degree of toxicity than would be possible after the admin-

\*Read at the annual meeting of the New England Surgical Society, Boston, October 1, 1938.

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istration of iodine Unfortunately, a large percentage of patients are given iodine at home regardless of the type of pathologic lesion, and this not only makes the diagnosis more difficult but occasionally does positive harm In 1 patient with a non-toxic adenoma active toxicity was induced by the taking of iodine

Our custom has been to give iodine to all toxic patients Those with hyperplasia are benefited Certain of the nodular group apparently do not obtain a remission, but in our experience none have been harmed The patients are seen again by the surgeon after medical treatment, and if ready for operation they are then transferred to the surgical service In uncomplicated cases, patients usually obtain maximum remission following iodine therapy in seven to ten days

#### PRELIMINARY MEDICATION

The night before operation the patient may be apprehensive Some form of sedative is indicated At present we give  $1\frac{1}{2}$  to 3 gr of Pentobarbital Under the existing organization a member of the anesthesia service sees the patient and issues this order and the one for the next morning, which usually calls for Pentobarbital two hours before operation and morphine and scopolamine one hour later, the doses depending on the case Most patients arrive at the operating room drowsy, some are sound asleep, and a few remember nothing until late in the afternoon after the operation

#### ANESTHESIA

With the exception of a few operations under novocain anesthesia, the entire series has been done with nitrous oxide and oxygen In the early years this was reinforced by two preliminary doses of morphine and scopolamine For a short time Avertin was tried as a basal anesthetic, supplemented by nitrous oxide and oxygen Our present routine seems satisfactory, particularly since the adoption of more up-to-date anesthesia machines containing carbon-dioxide filters

In our former operating rooms the use of ethylene and cyclopropane was unsafe because of the danger of explosion Since the opening of our present operating suite in June, 1938, the Trustees have granted us permission to use cyclopropane From experience in other hospitals we believe this to be the most satisfactory agent at present, since with this gas it is possible to use a very high percentage of oxygen and still get good relaxation Intratracheal anesthesia has been used in some of the intrathoracic goiters where there was tracheal deviation or narrowing

During the operation the anesthetist keeps a record of the blood pressure, pulse and respiration

If at any time the condition becomes alarming it is his duty to notify the surgeon The anesthetist has the power of final decision as to whether or not the operation shall be completed in one or two stages

A few patients in our series were fully awake on reaching the operating room despite their premedication, and could not be controlled with nitrous oxide and oxygen We never hesitate to return such patients to the ward and schedule them for another day, with heavier premedication This is a much wiser procedure than operating on a highly excitable patient Poor relaxation increases the technical difficulties, and patients in this excitable state do not do well postoperatively

#### OPERATION

After anesthesia is begun the patient's neck is hyperextended, the skin prepared and the field draped The line of incision is injected with a 1 per cent solution of novocain A collar incision is made 2 or 3 cm above the sternal end of the clavicle, its width varying with the size of the goiter and the length of the neck The skin and platysma muscle are divided, and as one layer the flap is dissected upward to the top of the thyroid cartilage and the lower flap is freed downward All bleeding points are clamped and tied At this stage the edge of the upper flap is grasped with a tenaculum and is held by an assistant

The fascia is next divided vertically from the thyroid cartilage to the suprasternal notch between the edges of the sternothyroid muscles The ribbon muscles are freed from the surgical capsule by blunt dissection and retracted laterally In the early years of this series these muscles were cut across, but for some years this has not been done except in special cases where a wider exposure was necessary We believe that division of the muscles predisposes to complications and tends to cause deformity of the neck

Before dislocating the lobe forward and mesially it is important to clamp and tie the middle thyroid veins If this is not done troublesome and uncontrollable bleeding may result The lobe can then be grasped with hooks, rotated, and the areolar tissue and muscle stripped from the posterolateral surface of the gland Downward traction with the index finger inside the capsule and sweeping about the upper pole will usually bring the latter forward into the wound The pole may be ligated at once or double-clamped, leaving a small bit of gland After resection the pole is transfixed by a suture and anchored to the tissues covering the lateral wall of the thyroid cartilage This prevents retraction of the branches of the superior thyroid artery

Next the suspensory ligament is divided, and also the pyramidal lobe, if present. The isthmus is divided and the lobe resected from within outward, making traction outward, with the index finger held behind the lobe to control bleeding. Very little of the trachea should be exposed, and a definite attempt to preserve a strip of the posteromesial surface of the lobe must be made so as to protect the recurrent laryngeal nerves and the inferior group of parathyroids. On the outer surface of the lobe the true capsule may be divided at a slightly higher level. This aids in reconstructing the lobe after resection.

The type of gland and the degree of toxicity determine the amount to be resected. This varies from two thirds to seven eighths of the total. Patients are restored to physiologic function with very little thyroid tissue remaining. Comparatively few become myxedematous, and these are readily controlled by thyroid extract. It seems preferable to risk this possibility rather than a persisting toxicity due to insufficient removal. Our tendency before experience taught otherwise was to do inadequate resections.

At this point in the operation all clamped bleeding points should be tied. More and more we have practiced ligating the inferior thyroid artery on one or both sides, until now it is an almost routine step. This is done close to the carotid artery after division of the deep cervical fascia. In no case have we found any resultant dysfunction. The outer capsule of the resected lobe is then turned toward the median line and the reconstruction of the lobe is completed by continuous or mattress sutures. The opposite lobe is treated similarly. A small rubber drain is inserted to the bed of the wound and the ribbon muscles are closed with interrupted sutures. Formerly ties and sutures were of catgut. For the past year fine silk has been used for ties and slightly heavier silk for sutures. There seems to be definitely less reaction from silk, and there is less postoperative accumulation of serum in the wound.

The neck is then slightly flexed and the skin flap is replaced with Michel clips. It is unnecessary to suture the platysma separately. The use of clips results in excellent scars. We remove half the clips and the drain in twenty-four hours, and the remainder in forty-eight hours. If they remain longer small areas of necrosis develop beneath the points of the clips and the scar is not satisfactory.

In patients with a discrete single adenoma we have been satisfied with enucleating the adenoma or doing partial lobectomy. In toxic adenomas with hyperplasia a subtotal thyroidectomy is in-

dicated. Where adenomas exist it is well to remove all pathologic tissue. This may amount to a subtotal thyroidectomy, but even in non-toxic patients sufficient normal thyroid usually remains to maintain the metabolic level.

#### POSTOPERATIVE CARE

The patient is accompanied to the ward by an intern, who sees that the proper orders are recorded. Good nursing at this stage is invaluable. The fact that the head nurses on the service have acquired considerable experience with thyroid patients has made our problem much simpler.

Since quiet is essential, isolation has been practiced so far as possible. Morphine and other sedatives are not given by the clock, but only as needed to prevent restlessness. Fluids are given by mouth since nausea is not prolonged and a great deal of liquid can be absorbed in spite of nausea and vomiting. Fluids containing Lugol's solution are also given by rectum for twelve hours. Intravenous glucose solution is given in the sicker patients, occasionally with the addition of Lugol's solution. A semi-solid diet is given the day following operation, and increased to full diet by the second or third day.

Most patients are co-operative. This is partly due to the fact that the surgeon has seen the patient before operation, and has advised him in advance what to expect in the way of postoperative discomfort and routine care.

The temperature is normally elevated to about 100°F following operation. Both pulse and temperature tend to reach normal about the third day. As soon as this occurs we allow patients with uncomplicated cases to stay out of bed for short periods, but do not urge them to do so. The average day of discharge is the seventh. Dressings are simple. If serum accumulates in the wound it is released with a fine probe. Healing takes place promptly. After discharge, patients return to the service for dressings and are referred to the Thyroid Clinic for further checkups.

#### ANALYSIS OF RESULTS

The distribution of cases in recognized pathological groups is given in Table 1. Women outnumbered men 6:1. The total number of toxic cases—nodular, diffuse and recurrent—is 374. The number of toxic nodular cases, 78 (22.8 per cent) of 342 primary cases, is considerably higher than that found in other reported series. Also this group usually has a mortality approximately twice that of the diffuse group. We are unable to account for this variation. The classification as nodular is based on pathological reports of adenoma with evidences of hyperplasia. The diffuse cases

also have been classified on the basis of pathological findings

The mortality figures for the period 1925-1937 are reported in Table 2. From 1925 to 1929 the

Table 1 *Distribution of Cases of Thyroid Disease Classified According to Lesion*

TYPE OF LESION		NO OF CASES
Goiter		543
Toxic		374
Nodular	78	
Diffuse	264	
Diffuse recurrent	32	
Non toxic		169
Nodular	155	
Diffuse	14	
Thyroiditis		10
Acute	5	
Chronic	5	
Carcinoma of thyroid		5
Aberrant thyroid		1
Total		559

mortality of toxic cases was 12 per cent, or 6 deaths in 50 cases. Twenty-four of these are classified as bad risks according to the criteria given below. In this period there were 18 two-stage operations and 4 preliminary pole ligations. In all probability these patients, with 4 exceptions, would have two-stage operations today because of the severity of their disease.

Nine of these 50 patients, or 18 per cent, had cardiac manifestations, 3 had evidences of beginning failure before operation, while 4 were

Table 2 *Mortality Rates in Goiter Cases, 1925-1937*

TYPE OF LESION	NO OF CASES	NO OF DEATHS	PERCENTAGE MORTALITY
Goiter	543	14	2.6
Toxic	374	12	3.2
Nodular	78	1	1.3
Diffuse (including recurrent)	296	11	3.7
Non toxic	169	2	1.2
Nodular	155	2	1.3
Diffuse	14	0	—

psychotic preoperatively. There were 2 cases of diabetes, one so severe that the patient went into coma twice before operation and showed sugar while getting 90 units of insulin a day. Another patient had severe myasthenia gravis complicating her hyperthyroidism, and died of respiratory failure. One of the patients with cardiac decompensation, fifty-four years of age, suffered in addition from bronchiectasis, and her goiter was substernal. One patient was four months pregnant, with toxic symptoms and severe vomiting which cleared up after thyroidectomy. One patient died on the operating table before the completion of a hemithyroidectomy, a respiratory death which we attribute to the anesthesia. Two of the 3 thyroid storms occurred in 1926. Two other patients in the early group died of cardiac failure. This analy-

sis shows that the mortality in the early period was due largely to the predominance of patients who were poor risks.

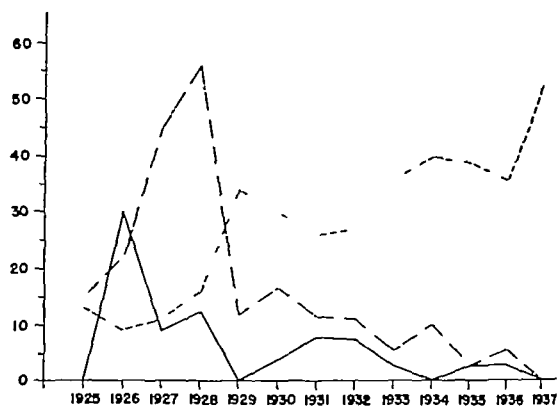


Figure 1 *Analysis of Toxic Thyroid Cases Operated on at the Boston City Hospital 1925-1937*

The dotted line represents the number of cases; the dot and dash line, the percentage of operations performed in stages; the solid line, the mortality rate.

The mortality rates from 1929 to 1937, shown in Table 3, represent a fairer average than do the figures for the entire period. The mortality rate

Table 3 *Mortality Rates in Goiter Cases, 1929-1937*

TYPE OF LESION	NO OF CASES	NO OF DEATHS	PERCENTAGE MORTALITY
Goiter	480	8	1.7
Toxic	324	6	1.9
Nodular	74	1	1.4
Diffuse (including recurrent)	250	5	2.0
Non toxic	156	2	1.3
Nodular	143	2	1.4
Diffuse	13	0	—

of 1.7 per cent in 480 cases contrasts favorably with one of 0.6 per cent for my series of 288 private cases in other hospitals. A factor in the low mortality of the latter series was that the patients were entirely under the care of one individual.

#### TOXIC CASES

An analysis of the toxic cases is summarized in Table 4. The poor risks included those with decompensated hearts, those with marked toxicity and poor response to iodine, those with emaciation, and the aged. This group was very rigidly selected, and several cases in which it was felt essential to do two-stage operations rather than risk a fatality are not included. The mortality rate of 23 per cent in this group emphasizes the exclusiveness of the group.

Eighty-five patients (23 per cent) were over forty years of age, a high percentage in a disease that is prone to attack youth and the middle-aged. The

oldest toxic patient was sixty-seven, the youngest twelve

The 11 patients with diabetes did uniformly well, though several were severely toxic. The incidence in our series is approximately three times as high as that reported by other clinics<sup>1,2</sup>. Six of these patients were over forty, and 3 had car-

Table 4 *Analysis of Toxic Cases*

TYPE OF PATIENT	NO OF CASES	PERCENTAGE OF TOTAL	NO OF DEATHS	PERCENTAGE MORTALITY
Poor risk	53	14.2	12	23
Over forty years of age	85	22.7	5	6
With diabetes	11	2.9	0	—
Psychotic	11	2.9	1	9
With cardiac disease	34	9.3	4	12
Fibrillating	14			
Decompensated	6			
With substernal thyroid	14	3.7	0	—

diac manifestations. One patient with an initial basal metabolism rate of +90 per cent had such severe diabetes that she went into coma on the morning she was to receive a basal metabolism test because of the omission of the morning dose of insulin. Over 700 urinalyses were done while she was in the hospital. Two pole ligations and

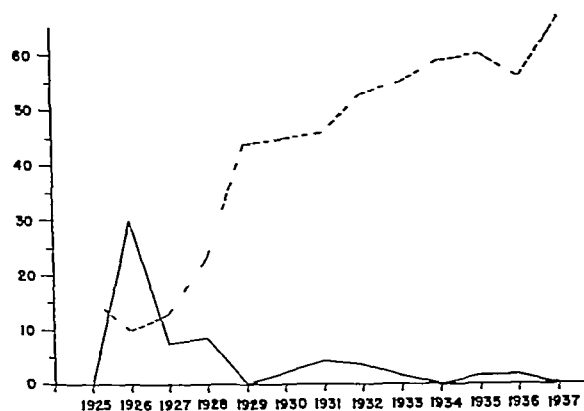


Figure 2. *Incidence and Mortality Rates in Toxic and Non-Toxic Thyroid Cases Operated on at the Boston City Hospital 1925-1937*

*The dotted line represents the number of cases, the solid line the mortality rate*

a two-stage thyroidectomy done in 1928 relieved the hyperthyroidism and markedly alleviated the diabetes until 1932, when she was operated on for a recurrence. The basal metabolism rate in 1937 was +7 per cent. Another patient had had three thyroidectomies elsewhere before coming to us with recurrence. Another went into coma a day after operation despite every effort to regulate her diabetes. One patient had a fasting blood sugar of 500 mg per cent on admission.

Most of the 11 psychotic patients were seen in

consultation by the Neurological Service and the diagnosis was confirmed by them. With one exception their psychotic symptoms disappeared within two weeks after operation. The greatest difficulty experienced with these patients was to keep them in the hospital until operation. They all had an untoward fear of operation, and 2 patients who were markedly toxic and psychotic left the hospital against advice without surgery, despite all attempts at dissuasion by the house staff and relatives. It is interesting that 2 patients came to us after temporary commitments in a psychopathic hospital, one six months and the other eight weeks previously, for "extreme nervousness".

Patients with cardiac complications constitute a group in which, as is generally recognized, the risks of surgery are great. Of the 34 patients with cardiac disease 4 died as a direct result of cardiac dysfunction, a mortality of 12 per cent, viewed in another light, 4 of the 12 total deaths, or 33 per cent, were due to cardiac failure.

It is difficult to classify the cases with cardiac complications. There were 6 cases which showed evidence of decompensation preoperatively, of these 3 were fibrillating. Eleven more were fibrillating but showed no other evidence of failure. Three patients were classified as having enlarged hearts and as fibrillating. One case was diagnosed as thyroid heart, 2 as hyperplasia with fibrillation, and 1 each as cardiac hypertrophy, angina pectoris, arteriosclerotic heart disease and aortic regurgitation. Eleven cases were diagnosed clinically as rheumatic heart disease on the basis of enlargement and the presence of aortic and mitral murmurs, this group is interesting from the point of view of diagnosis, and a heated debate ensued over a case in which Dr Ohler and Dr Soma Weiss felt that the aortic and mitral murmurs were not inconsistent with the heart of long-standing hyperthyroidism. Their contention seemed to be borne out by the autopsy findings, inasmuch as the heart valves were filmy and without evidence of pathologic change.

I am convinced that any patient with heart disease and the added burden of hyperthyroidism, even though it is apparently mild, is in urgent need of having the extra burden relieved by surgery. This applies also to adenomas which are clinically non-toxic. I have seen several cases of heart disease in which the removal of non-toxic adenomas resulted in improvement of the cardiac condition. The probable explanation is that any adenoma, however benign pathologically, may undergo mild toxic changes, involute and possibly revert to toxicity. This conforms to our knowl-



edge of the changes in the diffuse toxic type of gland, and it cannot be said that we know that an adenoma is harmless, aside from the possibility of malignant change

The number of patients in the entire series treated by stage operations was 42, or 11.2 per cent. The number so treated dropped off markedly from the period 1925-1929, and in 1937 there were no two-stage operations. This does not mean, however, that we think that such operations can be entirely dispensed with. There is a definite indication for them in poor risks, especially young adults with marked toxicity in whom the likelihood of storm is suggested by a rise in pulse to over 160 during the first part of the operation.

The cases of substernal goiters numbered 32—14 toxic and 18 non-toxic. An interesting feature of these cases was that all but four patients were over forty. There was 1 case of atelectasis and 1 fatal case of pneumonia in the non-toxic group. In practically all these cases the pretracheal muscles on one or both sides were cut to facilitate exposure. It is important as a safeguard against hemorrhage to ligate the blood supply preliminary to delivery of the gland.

An analysis of the 12 deaths in the toxic group shows them to fall largely in the categories of cardiac failure (4 deaths) and storm (3 deaths). One death each resulted from pneumonia, anesthesia, myasthenia gravis, glucose reaction and pulmonary embolism. The 2 deaths in the non-toxic group were the result of pneumonia and cerebral embolism respectively.

Among the toxic cases were several with complicating factors which required discernment in their management. It has been our policy to treat thyrotoxicosis first, in the presence of other surgical diseases. A Negress was admitted to our service with a diagnosis of acute appendicitis. She had marked tenderness and spasm in the right lower quadrant, a temperature of 99°F, a white-cell count of 12,000 and a persistent pulse of 120. Careful history disclosed increasing nervousness. There was mild exophthalmos, tremor, and a diffuse enlargement of the thyroid gland, with bilateral bruit. The basal metabolism rate was +33 per cent. The patient was given iodine and had a remission of toxic symptoms, but the abdominal signs did not abate. Surprisingly enough, the pain ceased within two days after the subtotal removal of a hyperplastic gland. It was our impression that the physical findings had been exaggerated by the increased irritability to stimuli accompanying the hyperthyroidism. Biliary colic with jaundice appeared in a patient with thyrocardiac disease while she was receiving iodine preoperatively. For-

tunately her jaundice and pain subsided and thyroidectomy was performed. She refused to return for abdominal exploration. A patient with typhoid fever had severe coincident toxic goiter, as a result of bilateral pole ligation the temperature dropped, and a case with poor prognosis progressed to early recovery.

I do not share the prevalent belief that the basal metabolic rate is a *sine qua non* in the diagnosis of thyroid dysfunction. More than most laboratory tests, it is subject to wide variation depending on uncontrollable factors. Oftentimes it is markedly lower or higher than the clinical findings indicate. One reading should never be accepted as final, and if repeated readings are at variance with the other data in a given case, too much weight should not be placed on them. One patient in our series had all the symptoms of hyperthyroidism, and a basal metabolic rate repeated several times revealed an average reading of -11 per cent. A hyperplastic gland was removed, after which the patient returned to normal, without any symptoms of myxedema and with a basal metabolic rate of -20 per cent.

#### POSTOPERATIVE COMPLICATIONS

The feature of our series which gives us the greatest satisfaction is the low incidence of postoperative complications (Table 5). Hemorrhage,

Table 5 *Postoperative Complications*

COMPLICATION	NO. OF CASES	PER CENT
Psychosis	4	1.0
Thyroid storm	3	0.8
Wound infection	3	0.8
Pneumonia	3	0.8
Atelectasis	2	0.5
Tetany	2	0.5
Mediastinitis	1	0.2
Cerebral embolus	1	0.2
Pulmonary embolus	1	0.2
Scarlet fever	1	0.2
Urinary retention	1	0.2

as we understand the word, was non-existent. In 2 cases there was a bloody ooze which necessitated changing the dressing three times within the first twenty-four hours after operation, but in neither case was there any reaction in the patient's general condition, nor were any efforts to control the bleeding necessary.

The sole transfusion in the entire series was given to a patient who developed mediastinitis and secondary anemia from prolonged sepsis. This was our only case of mediastinal infection. The patient, a woman of twenty-six, underwent a subtotal thyroidectomy on December 6, 1934. Four days later the temperature rose to 102°F, and later physical examination revealed signs of pneumonia, which were confirmed by x-ray. The patient complained of pain under the sternum, and

the fever continued. Slight widening of the mediastinum was noted in subsequent roentgenograms (Fig 3). The wound meanwhile had healed by first intention. Since the patient's condition was not alarming, it was thought that conservative treatment was indicated. By January 5, 1935, the mediastinal shadow had increased considerably, with deviation of the trachea to the right. The neck had become indurated and the wound was bulging. The wound was opened, with the escape of several ounces of creamy pus which on culture showed hemolytic streptococci. Without any attempt to explore the abscess a drain was placed in its cavity. The temperature promptly subsided, drainage ceased in two weeks, and the pa-

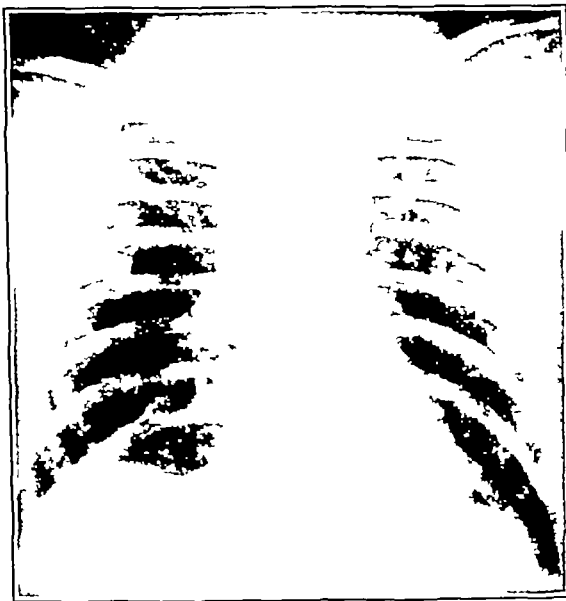


Figure 3

tient was discharged six weeks after her primary operation.

There were only 2 cases of tetany, both were temporary and were relieved by the administration of calcium. Pulmonary complications, including both pneumonia and atelectasis, totaled only a little over 1 per cent. There was 1 case of paralysis of a single vocal cord. In 2 cases the trachea was inadvertently nicked, it was immediately closed with one or two interrupted sutures, including a piece of muscle, and no complications resulted. One of the cases of atelectasis and 1 of those of pneumonia occurred in the non-toxic group, the only other complication in that group was a fatal case of cerebral embolism.

In 17 of the 32 cases of toxic recurrence the primary operation had been performed by us. This is an incidence of recurrence in our series of 4.9 per cent. Although no attempt was made to trace

the whole series of cases we believe that practically all the patients returned to our follow-up clinic and, hence, that this percentage of recurrence is approximately correct.

#### MISCELLANEOUS CASES

Four of the 5 cases of acute thyroiditis, all suppurative and all operated on, occurred subsequent to our report<sup>3</sup> of 10 cases of acute thyroiditis in 1934. A mortality of 50 per cent in these 4 cases, in spite of every effort to save the patients, emphasizes the gravity of the disease. It is interesting to note that 1 of these patients, drained in 1936 with recovery, was operated on at another hospital in 1937 and an intrathoracic malignant tumor of thyroid origin was found. The 5 cases of chronic thyroiditis conformed in general to groups of cases well described in the recent literature. Three were of the Hashimoto type.

The 5 cases of malignancy were undiagnosed before operation, and hence may indicate the percentage that will be encountered in a group of adenomas supposed preoperatively to be benign. They are not an index of the relative incidence of malignancy, since during the period covered by this report there were several cases which were presumptively diagnosed as carcinoma of the thyroid, but which had advanced beyond the reach of surgical therapy.

The single aberrant thyroid was found between the skin and the ribbon muscles, and appeared to be a misplaced lobe, as one lobe was in its normal place and the other was absent.

#### SUMMARY AND CONCLUSION

The development of the management of patients with thyroid disease at the Boston City Hospital is discussed, and a series of 559 cases treated surgically from 1925 to 1937 is analyzed. Interesting aspects, mortality rates and complications are considered.

This series justifies the belief that with adequate organization, plus considerable personal effort, patients with surgical diseases of the thyroid can be satisfactorily cared for in a large municipal hospital.

319 Longwood Avenue.

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#### DISCUSSION

DR ISAAC M. WEBBER, Portland, Maine. The financial state of our community in Maine being as restricted as it is, it seems likely that a material number of indigent patients with goiter will be treated in some of our small community hospitals instead of being sent to medical

centers where the last refinement in diagnosis and treatment is available. It becomes the duty of some of us connected with these hospitals to render the best service we can to these unfortunates

On the service at the Maine General Hospital we have endeavored to approximate the good results that have been reported by Dr Cochrane and others. In a group of 200 consecutive goiter patients surgically treated, 2 succumbed in the hospital. Every patient, regardless of the severity of the thyrotoxicosis or any other complication, was subjected to operation before leaving the hospital.

As to the 2 fatalities, 1 patient had been thyrotoxic for four years, had had two incomplete resections of the thyroid in another hospital, and came to us some three months later in a thyroid storm. After what we believed to be an adequate preparation, she was subjected to operation at which time the greater part of one thyroid remnant was resected with very little difficulty, yet the patient developed a fatal thyroid storm. The second non survival was an emaciated woman, thyrotoxic for many months, brought to us because of a psychosis, the salient features of which were absolute disorientation and the belief that her food was being poisoned. After an attempt at preparation which was unsatisfactory because of the patient's inability to co-operate, superior pole ligations were performed and later a subtotal lobectomy. The operation resulted in an exacerbation of symptoms which caused death.

As you would surely expect, I think, depleted organic reserve and independent heart disease were the two factors which most frequently caused some of our patients to be placed in the bad risk group. Of 36 patients with varied degrees and types of cardiac damage, 6 had congestive failure at the time they arrived at the hospital, yet all survived thyroidectomy. The major complications relating to surgical technic comprised 3 cases of transient tetany, injury to a single recurrent nerve, and bleeding in 1 case which necessitated reopening of the wound.

In the light of our incomplete knowledge of the etiologic factors in goiter, the impression that I have gained, both from the management of a small group of cases and from the reported experiences of others, is that the present morbidity may be further reduced if some means can be devised whereby patients are brought to proper management and operative treatment before their organic reserve is too badly depleted by long standing thyrotoxicosis.

The management of goiter at the Maine General Hospital in the past seven years has been conducted much as outlined by Dr Cochrane, therefore his comprehensive analysis of the work done at the Boston City Hospital has been of particular interest to me.

DR. THACHER W. WORTHEN, Hartford, Conn. It is hardly necessary to state that there are certain groups of cases in general surgery for which special assignments produce better than average results. This is particularly true of thyroid surgery and of surgery of the gastrointestinal tract. There are many institutions, however, in which this is a difficult if not impractical arrangement under existing conditions. The problem in such hospitals is that of endeavoring to lift the general average of surgery done for these conditions. Much will depend on the initiative and ability of the operator, but in general hospitals it seems to me that if left to these two factors alone satisfactory progress will not be made.

A third factor can be brought into play which in our experience during the past four years has seemed to produce satisfactory results, that is the annual report to the staff of a detailed analysis of all hospital deaths, grading them with reference to avoidability, to investigation, to preoperative and postoperative care, to operation, to consultations, to records, and so forth. When this is done, the mortality rate in those groups in which it was too high will drop and there will be fewer avoidable deaths. For example, our total hospital mortality rate for thyroidectomy in cases of toxic diffuse thyroid disease was about 3 per cent, individual groups of cases treated by certain surgeons being lower. The group of toxic nodular thyroid disease presented a mortality well under 2 per cent. There was an incidence of malignancy of 1 per cent in our series of 893 cases.

Dr Cochrane's excellent results are a splendid tribute to his individual effort. It is noteworthy that he has no recorded case of damage to the laryngeal nerve or of hemorrhage.

In spite of the reporting of excellent mortality rates and few complications, there remain the problems of recurrences, of cases that are not benefited in any way by thyroidectomy, and of iodine fixation at high basal rates, which is with us an increasing rather than a diminishing factor.

DR. DAVID W. PARKER, Manchester, N. H. We have had a considerable series of cases for a small hospital, and sometime I hope to report them. The iodine fast cases, referred to by Dr Worthen, are particularly distressing and hard to prepare for a safe thyroidectomy. I think that we as a group can do something about this. Iodine is too generally used by the family physician when he sees a toxic thyroid. I think that if he could be impressed with the fact that the administration of iodine is absolutely dangerous except as a preoperative measure, we should accomplish a great deal in reducing the number in this bad risk group of iodine fast cases.

ELECTROCARDIOGRAPHIC CHANGES IN VITAMIN B<sub>1</sub> DEFICIENCY\*

CECIL C DUSTIN, M.D.,† HENRY WEYLER, M.D.,‡ AND C PURCELL ROBERTS, M.D.§

PROVIDENCE, RHODE ISLAND

SEVERAL patients recently admitted to the Rhode Island Hospital with clinical evidence of vitamin B<sub>1</sub> deficiency showed abnormal electrocardiograms that might be interpreted as indicative of serious myocardial disease, but under a high-vitamin regime the patients recovered within a few weeks.

Electrocardiographic abnormalities in patients suffering from vitamin B<sub>1</sub> deficiency have been observed and reviewed by various writers. Little emphasis, however, has been placed on the possibility of confusing the electrocardiographic changes found in certain cases of beriberi cardiovascular disease with those found in other myocardial disturbances. Aalsmeer and Wenckebach<sup>1,2</sup> studied the cardiac aspects of beriberi among the inhabitants of Java. Electrocardiograms were normal except for a shortening of the conduction time and tachycardia. The P-R interval was 0.12 second or shorter. It returned to normal during convalescence. There was increased skin resistance, even greater than that found in myxedema, although the deflections were normal or much larger than normal. Keefer,<sup>3</sup> referring to another article published by Aalsmeer and Wenckebach, notes that they also found right ventricular preponderance in some cases. In this country Scott and Herrmann<sup>4</sup> described negative T<sub>1</sub> and T<sub>3</sub>, and said that some patients showed left and others right ventricular preponderance. Moreover, they called attention to the low voltage and to slight aberrations in the ventricular complexes. In 1 of their cases they noted a greatly prolonged R-T interval. Keefer,<sup>3</sup> reporting a series of cases in Peiping, China, stated that there were no characteristic changes in the electrocardiogram, although there was some evidence of myocardial disease. He described low voltage, right and left ventricular preponderance and negative T waves. Weiss and Wilkins<sup>5,6</sup> also found abnormalities of the T waves, low amplitude prolongation of the electrical systole (Q-T) and sinus tachycardia. In addition they noted changes indicative of coronary or myocardial disease, these complexes returned to normal with adequate vitamin B<sub>1</sub> intake. Some of these abnormalities were

found before and some after treatment was begun. As the patients improved following the administration of vitamin B<sub>1</sub> they showed increased utilization of oxygen, slowing of blood flow, diuresis, slowing of the heart rate, increased vital capacity and a decrease in the size of the heart, but the electrocardiographic abnormalities were the last to disappear. Zoll and Weiss<sup>7</sup> were able to reproduce many of the abnormal variations in an experimental study on rats kept on a diet deficient in vitamin B<sub>1</sub>. Moreover, normal electrocardiograms were re-established after a definite vitamin B<sub>1</sub> intake. Feil<sup>8</sup> found similar but more variable changes in a group of patients with pellagra, namely inversion of the T waves in Lead 1 or 2 or both, a Pardee type of S-T with large T waves. Both electrical and mechanical systoles were prolonged. Weiss and Wilkins<sup>6</sup> suggested that these abnormalities were due to deficiency of vitamin B<sub>1</sub> rather than to that of other fractions of the vitamin B group. Their reason was that similar changes were induced in rats with vitamin B<sub>1</sub> deficiency and in patients without pellagra.

We are presenting several cases with histories of unbalanced diets and clinical evidence of vitamin B<sub>1</sub> deficiency. These patients all showed abnormal electrocardiograms. The group comprises 6 male patients ranging in age from thirty-four to fifty. All gave a history of habitual use of alcoholic beverages, usually beer, and concurrently a deficient diet. All entered the hospital because of swelling of the legs and some dyspnea. Two also had swelling of the abdomen. In only 1 case was there a complaint of substernal discomfort, the sensation was of questionable significance and occurred long after the onset of symptoms and electrocardiographic changes. Four patients did not show patellar or Achilles tendon reflexes, and in 1 these reflexes were sluggish. There were sensory abnormalities such as hypesthesia and paresthesia in 2 cases, and a recent history of transient paralysis of the right arm in 1. All but 1 patient received a high-vitamin diet, and all received vitamin B<sub>1</sub> medication. In 2 cases the heart sounds showed notable changes with treatment, in 1 of these a gallop rhythm disappeared soon after entrance. In 3 cases marked reduction in the size of the heart was demonstrated, either by percussion or by x-ray examination, as treatment progressed. In 1 case slight enlargement

From the Heart Station of the Rhode Island Hospital, Providence, Rhode Island. Presented at a meeting of the New England Heart Association, Boston, April 25, 1938.

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was shown by x-ray early in treatment but no film establishing the return to normal could be obtained subsequently, and in 1 case the persistent enlargement was thought to be related to hypertensive heart disease. Estimations of total protein of the blood were normal except in 2 cases, in which the percentage was slightly below 50 gm per cent. In only 1 case was there definite anemia, hypochromic in type, and this responded to treatment during the hospital stay. All patients exhibited a weight loss of from 8 to 28 pounds, the average being 18.4 pounds in twelve days, concurrently with reduction of edema. Only 1 patient received digitalis in addition to vitamin therapy.

#### CASE REPORTS

*Case 1* A D, a 39-year-old French Canadian cloth examiner, entered the hospital November 26, 1937, because of swelling about the ankles and enlargement of the abdomen. For 6 months he had been drinking some whiskey and twenty to thirty glasses of beer a day. He had been eating only two meals a day and taking very little fruit or green vegetables. He had suffered no sub-sternal distress. There was no orthopnea, but for a short time he had noticed dyspnea on exertion.

On admission the temperature was 99°F, the pulse 100 and the blood pressure normal. The apex impulse of the heart was palpable in the fifth left intercostal space 10 cm from the midsternal line. The sounds were of good quality. There were no murmurs. The peripheral arteries were not thickened. There was shifting dullness in the flanks of the abdomen, and a slightly tender liver edge could be felt 2 fingerbreadths below the costal margin. There was slight pitting edema around the ankles. Patellar and Achilles tendon reflexes were absent.

The patient was placed on a high-vitamin and high protein diet, and starting on the 2nd day was given by mouth and intravenously about 9 mg of vitamin B<sub>1</sub> daily\*. An x ray on the 7th day showed a slight increase in the size of the heart shadow, with evidence of chronic passive congestion in both lung roots. There was no free fluid in the pleural cavities. By the 12th day edema was practically absent and the patient was out of bed. The weight changed from 188 pounds on the 2nd day to 180 pounds on the 13th.

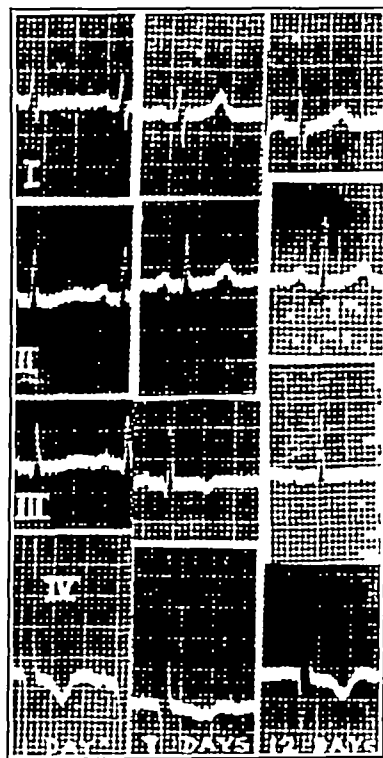
This patient presented electrocardiographic changes (Fig 1) that are of interest, on admission the record showed flattening of the T waves, a low voltage and a rapid rate. These alterations became much less marked within a very few days. He was not clinically very sick, although the first record might give that impression.

The urine was free of albumin. Glucose tolerance tests were normal. The galactose tolerance test 4 days after admission showed no excretion (normal excretion is from 0 to 3 gm). The hippuric acid excretion test, done 1 day after admission, was 22 per cent of normal, 11 days later, during diuresis, it was 80 per cent, and 2 days later it was 58 per cent. Thus although the galactose tolerance test was normal the hippuric acid test showed some evidence of decreased liver function. The fact that the liver function test improved following diuresis seems to indicate that the decreased liver function was due to cardiac decompensation and passive congestion. The fact that

the blood cholesterol was not low—it was 276 on admission and 184, 13 days later—corroborates this interpretation. Phenolsulfonephthalein excretion showed a total of 65 per cent. There was no anemia and the blood smear was normal. Blood chemical determinations were within normal limits. An icteric index was normal.

The patient was discharged from the hospital on the 18th day.

*Case 2* J K, a 36-year-old, unemployed Irishman, entered the hospital on August 9, 1937, complaining of swelling of the legs and cough for the last 2 weeks. For the last 10 years he had drunk large amounts of alcohol, and for the last 2 years had been eating poorly, taking



Bazett's K = 0.420      0.390      0.400

Figure 1 Case 1

Note later increase in height of T waves (precordial leads by old method)

almost no meat. There had been frequent episodes of delirium tremens. For the last few months he had become progressively weaker, and dyspneic on the slightest exertion. He could not lie flat without discomfort. He had at no time suffered pain in the chest and had not noticed palpitation. Only once previously had he noticed swelling of the legs. This subsided after bed rest.

On entry the patient was obviously dyspneic. A few rales were heard at the base of the right lung. The blood pressure was 128/80. By percussion the left cardiac border was measured 8 cm from the midsternal line, just within the midclavicular line. The apex impulse was felt in the fifth interspace. The cardiac rate was 110, the action regular and the sounds of good quality. The liver was not felt. The hands, thighs and lower legs showed pitting edema. No reflexes could be elicited in the legs.

\*Betalin S (Lilly) synthetic vitamin B<sub>1</sub> was used in all cases

After the 1st day the patient began to receive a well rounded diet and about 10 mg of added vitamin B<sub>1</sub>. By the 3rd day the edema of the legs had disappeared, although on the 5th day a little sacral edema was still present. By the 8th day the patient was allowed to be out of bed. At the end of 2 weeks there was no clinical evidence of myocardial disease and the patient complained of no pain whatsoever. The blood pressure on the 14th day was 132/98. The weight dropped from 123 pounds on the 2nd day to 110 pounds at the end of 2 weeks.

tions for syphilis were negative. The urine showed an occasional trace of albumin. Morphological and chemical blood studies showed nothing abnormal except a slightly lowered blood protein on admission. This became normal by the 10th day.

The patient was discharged on the 21st day.

**Case 3** J. V. G., a 34-year-old Irish bartender, entered the hospital on October 14, 1937, complaining of shortness of breath and swelling of the abdomen and ankles.

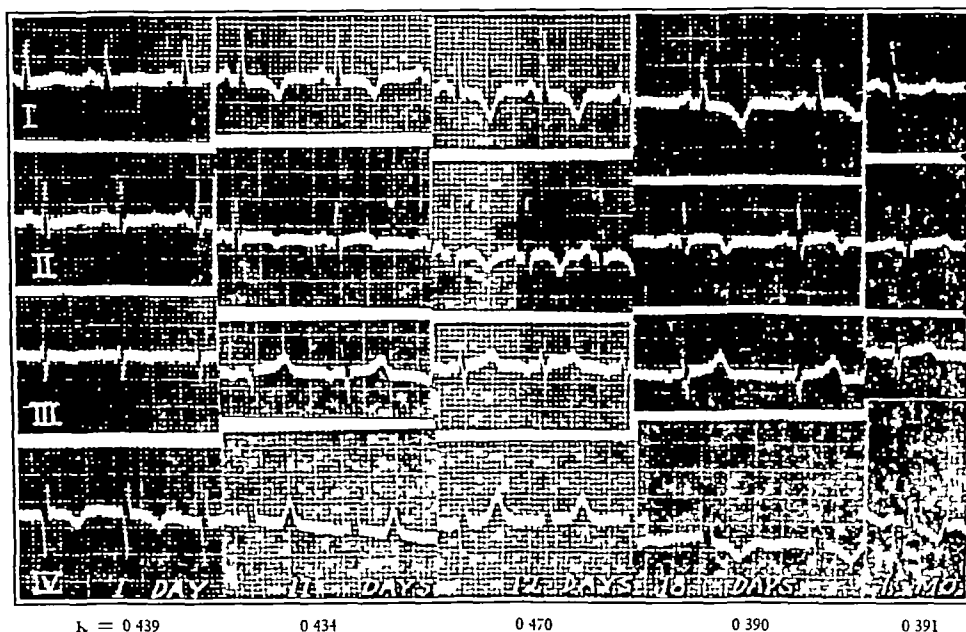


Figure 2 Case 2

*Note return of T waves to normal after marked inversion Q<sub>4</sub> wave persistently present (precordial leads by old method)*

The first electrocardiogram (Fig 2) was not normal for a young male adult. The rate was rapid and the ventricular complexes showed absent or flattened T waves. In 10 days, coincident with definite clinical improvement, the electrocardiogram had changed to such an extent that it could well be mistaken for that of an anterior coronary occlusion. The abnormality increased somewhat and then showed a slight trend toward a more normal condition. On the patient's discharge, when he was clinically well, the electrocardiogram was decidedly abnormal, even in the chest lead, which generally in this series of cases showed little disturbance. A record made 7 months later was similar to the first in this study.

An x-ray film on admission showed slight diffuse enlargement of the heart shadow with congestion about the lung roots. No fluid was found in the costophrenic angles. A week later a film showed the same increase in the heart size, but an improvement in the pulmonary congestion. Orthofluoroscopy on the 12th and 21st days confirmed the persistent slight enlargement of the heart suggested by x-rays, the cardiothoracic ratio being 12.8 to 23.3 cm and 12.5 to 24 cm respectively. The heart was globular in shape, and there was moderate dynamic dilatation of the proximal portion of the aorta. On a return visit 7 months later, orthodiagraphy showed the same measurements.

Laboratory findings showed that the serological reac-

tion of 3 weeks duration. For the last 15 years the patient had frequently taken as much as a quart of liquor a day. Three years previously he had had some swelling of the ankles. For the last 3 years he had been a bartender and had been taking his meals irregularly. One month before entry he had begun to notice shortness of breath on climbing stairs, and shortly after this, swelling about the ankles and enlargement of the abdomen.

On examination the blood pressure was 130/90. By percussion the heart was apparently of normal size. No murmurs were made out. The second pulmonic sound was equal in intensity to the second aortic sound. In the abdomen there appeared to be fluid in the flanks, and the liver reached below the costal margin, as was judged by percussion. There was pitting edema of both legs. The patellar reflexes were absent. There were no sensory disturbances.

At entrance the patient was given a high-carbohydrate and low-fat diet, with added vitamin B<sub>1</sub>. On the 4th day the diet was altered to contain more protein. The patient received no diuretic. The course was afebrile. The blood pressure remained low—120/80 on the 12th day and 90/60 on the 18th. By the 6th day the edema had begun to clear and by the 11th day it was gone. The patient was up and about the ward by the 21st day.

An x-ray of the chest on the 4th day showed a transverse enlargement of the heart shadow, and evidence of

marked congestion in the lung fields (Fig 3 C-1) On the 11th day re-examination of the chest showed clearing of the lung fields, and the heart appeared smaller

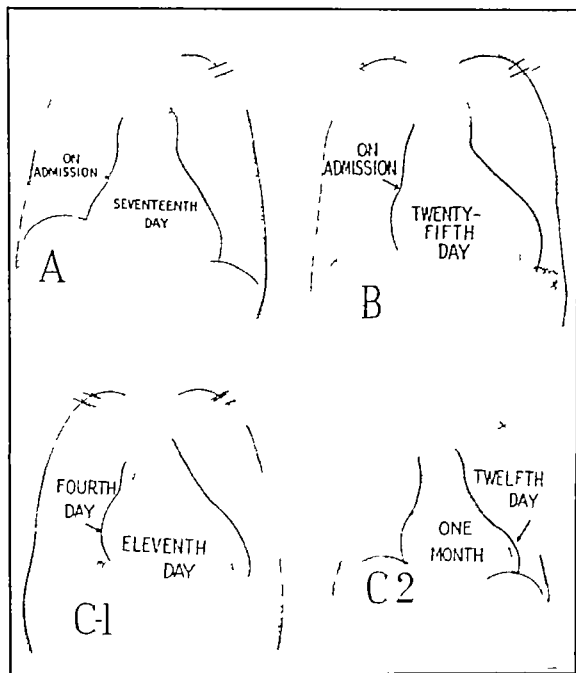


Figure 3 Diagrams to Indicate Shrinkage in Size of the Heart with Therapy

A represents Case 4 B, Case 5, and C-1 and C-2 Case 3

On the 12th day fluoroscopy showed that the diaphragm moved normally The heart was very slightly enlarged to the left (Fig 3 C 2), and the aorta not widened The

Electrocardiograms showed that during treatment the heart rate became slower but the abnormal ventricular complexes were intensified, finally the record became confined within normal limits (Fig 4) There were no clinical findings to account for the unusual changes in the electrocardiograms

Laboratory findings included a negative Wassermann test, evidence of a slight hypochromic anemia, and normal protein, urea, glucose and cholesterol determinations Galactose tolerance and hippuric-acid tests were normal The urine was normal except for an occasional trace of albumin

The patient was discharged on the 23rd day

**Case 4** J L, a 45-year-old Italian laborer, entered the hospital December 22, 1937, complaining of swelling of the legs and ankles and shortness of breath for the last 3 weeks He had given up work as a laborer He had been drinking beer, at times in excess, and his dietary habits had been poor The temperature on admission was 98.6°F, the pulse 80, the respirations 20 and the blood pressure 120/80

The apex impulse of the heart was palpated in the fifth left intercostal space 8 cm from the midsternal line, and by percussion there seemed to be enlargement. The sounds were faint and muffled. The lungs were clear The liver could not be felt below the costal margin. There was slight pitting edema from the ankles to the knees The patellar and Achilles tendon reflexes were sluggish, while others were hyperactive.

In the hospital the patient received a high vitamin diet, with about 10 mg of vitamin B<sub>1</sub> added daily By the 9th day he was up and about without recurrence of edema On entrance an x ray film showed an elevated right diaphragm and a heart shadow moderately enlarged in its transverse diameter, and apparently displaced to the right (Fig 3 A) No free fluid was demonstrable. Four days later the heart shadow appeared to be of the same size, but subsequent x rays showed a marked diminution in

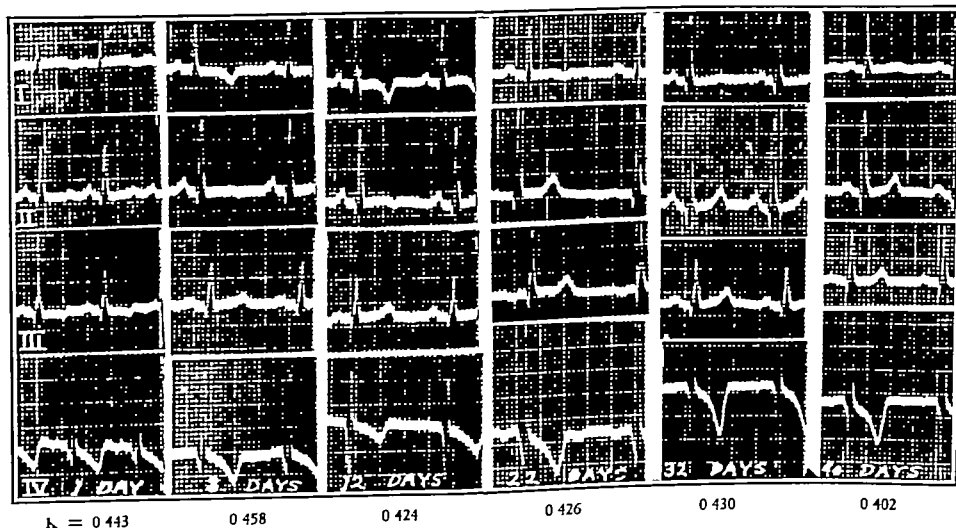


Figure 4 Case 3

Note T<sub>1</sub> and T<sub>2</sub> inversion at eight and twelve days with return to normal later (precordial leads by old method)

cardiac pulsations were feeble. Orthofluoroscopy this same day showed a cardiothoracic ratio of 14.4 to 26.2 cm, and 1 month after entry the heart was further reduced so that the ratio was practically normal, 13.1 to 25.9 cm.

the size of the heart and a clearing of the lungs Orthodiagrams made on the 19th day, 1 day before discharge, showed a cardiothoracic ratio of 11.5 to 25.3 cm, contractions of good quality and slight dynamic dilatation of

the proximal aorta. The course was afebrile. On the 2nd day the patient weighed 145 pounds, but by the 6th day only 118 pounds. The latter weight remained constant during the remainder of his hospital stay.

A series of electrocardiograms showed that the low voltage, rapid rate and flattening of the T waves in the first tracing all changed rapidly toward normal (Fig 5)

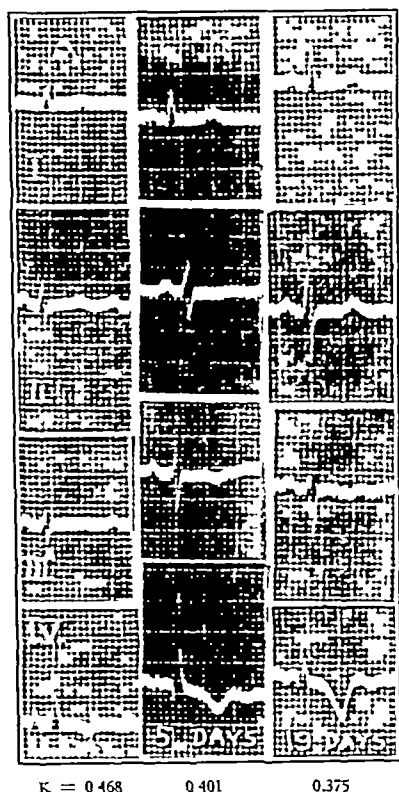


Figure 5 Case 4

*Note increase in voltage and in height of T waves after treatment (precordial leads by old method)*

The second and third tracings showed changes in the ventricular complexes in Leads 2 and 3 that were difficult to explain, particularly as the man was not in any way incapacitated physically, and had no symptoms suggestive of sudden myocardial changes.

Laboratory tests showed only an occasional trace of albumin in the urine and no abnormal blood findings.

The patient was discharged on the 20th day.

**Case 5** E. B., a 41-year-old Irish American truck-driver, entered the hospital July 14, 1937, because of swelling of the legs and ankles for 2 months. There had been three previous hospital admissions. In 1932 there was paralysis of the right arm after a drinking bout, and a lump which lasted until discharge 7 days later. The patellar and Achilles tendon reflexes were hyperactive. In December, 1932, he was readmitted because of painful joints, but had no fever. No abnormal findings were noted in the heart. Malnutrition was present. In July, 1936, he re-entered the hospital because of ankle edema and dyspnea. The blood pressure was 150/80. The heart was slightly enlarged to the left. There was a systolic murmur over the left side of the heart, and the

x-ray silhouette suggested mitral stenosis. The liver was felt 3 fingerbreadths below the ribs.

On July 14, 1937, the patient again complained of shortness of breath on exertion, and swelling of the legs. He had noticed palpitation. He gave a history of excessive beer-drinking, but asserted that he had been eating three meals a day in restaurants. He admitted no ataxia or paresthesia. The blood pressure was 120/80. There was a tremor of the tongue. Only occasional rales were noted at the lung bases. The heart seemed to be much enlarged to the left, and a definite gallop rhythm was heard. There were no definite murmurs. The rate was 120 and the action regular. The sounds were only of fair quality, and at one examination there appeared to be both systolic and diastolic apical murmurs. The liver was not felt. There was edema of the abdominal wall to the costal margins, and also of the back, legs and scrotum. No patellar or Achilles tendon reflexes were obtained, and there was impaired sensitivity to pain in the lower legs.

The patient was given digitalis for 9 days and ammonium chloride three times a day for 6 weeks. Besides a high-vitamin diet, he received 10 mg. or more of vitamin B<sub>1</sub>. On the 3rd day he received 1 cc. of Salyrgan. By the 4th day, the lungs were clear and the edema was nearly gone, some remaining in the genitals. One week after admission the heart sounds were noted to be much stronger, with only a very soft apical systolic murmur remaining. The second pulmonic sound was louder than the second aortic sound, and accentuated. The blood pressure was 160/110. Furthermore, the heart seemed definitely decreased in size by percussion. The former gallop rhythm had disappeared. At the end of 2 weeks there was no pulmonary or peripheral edema. The heart was slow and regular, and the sounds were of good quality. The left border of the heart was 11 cm. from the mid-sternal line. The patellar tendon reflexes were still absent, although there was less numbness in the legs. On the 17th day an x-ray showed definite decrease in the size of the heart. Toward the end of the 4th week the patient complained of palpitation. After 1 month in the hospital he mentioned a feeling of constriction in the left chest, and seemed unduly excited by the interest shown in his condition. After 6 weeks he was allowed to be up and about the ward, at which time a marked weight loss was evident. There had been a loss from 165 pounds on the 6th day to 137 pounds at the end of 1 month. The latter weight remained constant until discharge, after nearly 2 months in the hospital.

On entrance, an x-ray film showed a large left ventricle and an increased supracardiac shadow (Fig 3 B). There was passive congestion of the lower two thirds of the lung. Five days later there were practically the same findings. Fourteen days later there was clearing of the hilar shadows but still a slight diffuse enlargement of the heart. Twenty-three days later there was a definite decrease in the size of the heart, with clearing of the lungs and no remaining supracardiac widening. Orthofluoroscopy on two occasions after this time indicated that subsequently the heart remained constant in size and was well within normal limits, the cardiothoracic ratio being 12.5 to 27.5 cm.

A series of electrocardiograms covering a period of 6 weeks showed changes that might be mistaken for those due to coronary occlusion (Fig 6). On the previous admission a year earlier the record showed a rapid rate, low voltage and increased electrical systole. These conditions improved during treatment. On this admission, after 1 week of treatment, although the patient was clinically well the tracing was quite abnormal. During the re-



mainder of the study the electrocardiograms returned to normal. The patient showed little clinical evidence of serious heart disease, such as might have been expected from the electrocardiographic changes.

Laboratory studies showed nothing abnormal except an occasional trace of albumin in the urine and a moderate secondary anemia, which disappeared before discharge.

**Case 6** H A G, a 50 year-old German boxing instructor, entered the hospital September 4, 1937, complaining of swelling of the legs and eyelids for 10 days. The patient gave a history of drinking ten to twenty glasses of beer daily for the past 6 months and neglecting his meals. He had recently noticed shortness of breath on exertion.

to be enlarged to the left. Orthofluoroscopy on three occasions showed no significant change in the cardiovascular shadow over a period of more than 2 months. Elevation of the right diaphragm continued to be present, as well as dynamic dilatation of the proximal aorta. The cardiothoracic ratio averaged 136 to 265 cm.

The first electrocardiogram tracing, although quite unusual, should probably be considered within normal limits (Fig 7). In 5 days the previously high T waves had flattened to the lower limits of normal. In succeeding records the ventricular complexes showed a trend toward the form seen in the first record.

Other laboratory findings were negative.

The patient was discharged on the 16th day.

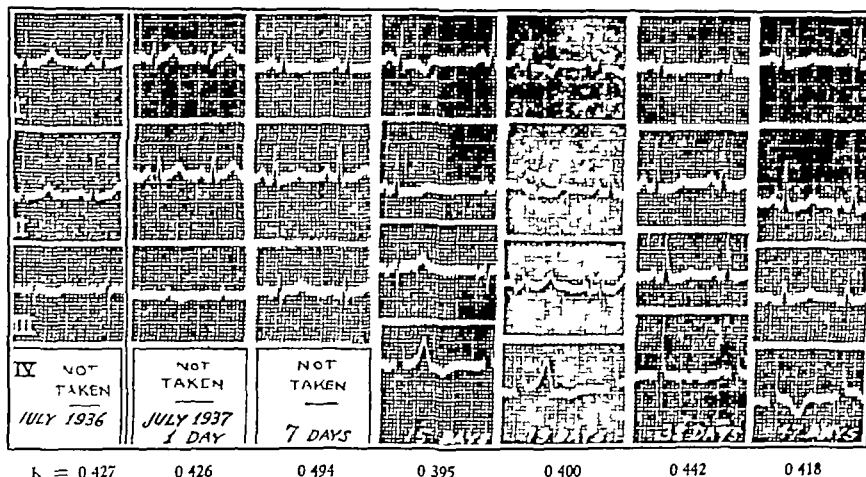


Figure 6 Case 5

Note return of inverted T waves to normal changes in  $T_4$ , but constant presence of  $Q_4$  (precordial leads by old method)

There was trembling of the hands. For several days the right hand and foot had been numb, without noticeable ataxia. There was no pain in the chest.

The blood pressure was 170/90. At both lung bases moist rales were present. The apex impulse was found in the fifth left intercostal space 11.5 cm from the mid sternal line. The action was regular, with a rate of 84 and an occasional extrasystole. The second aortic sound was louder than the second pulmonic sound and there was a soft systolic murmur at the apex. The first heart sound was somewhat booming. The liver edge was not palpable and there was no ascites. The legs showed no motor or sensory disturbance, but there was moderate pretibial edema, with none in the feet or over the sacrum.

The patient was given a diet high in protein and vitamins, with about 10 mg of vitamin  $B_1$  added. Forty-eight hours after admission the edema was entirely gone and the lungs were clear. By the 4th day the patient developed delirium tremens and was sent to the disturbed ward. He had then a rectal temperature of  $104^\circ\text{F}$ . On the 5th day the venous pressure was 39 mm of water and the circulation time by the ether method was 9, 9 and 75 seconds respectively. The blood pressure remained elevated, being 150/100 at discharge. The patient lost 15 pounds in 11 days, weighing on the 4th day 158 pounds and on the 15th day 143 pounds. Except for the episodic fever of  $104^\circ\text{F}$  the course was afebrile.

X-ray films of the chest on entrance showed the left lung more radiant than the right and the right diaphragm elevated as if due to an enlarged liver. The heart seemed

#### COMMENT

Each case in this series was followed by repeated electrocardiograms at rather close intervals while under treatment. In the chest leads the old method was used. The common features seen on admission were increase in the electrical systole, according to Bazett's formula, a rapid rate and a tendency to low voltage, and in most cases a flattening of the T wave in Leads 1, 2 and 3. The chest leads showed the least tendency to become abnormal. In subsequent records, during treatment, all cases showed a slowing of the rate, an increase in the voltage and varying changes in the ventricular complexes. The changes in the ventricular complexes during treatment occurred quite rapidly, usually within a few days, curiously, as treatment progressed, during the first week or two the electrocardiograms became more abnormal and then tended to return toward normal (Figs 2, 4 and 6). The abnormal ventricular complexes changed more rapidly than would be expected in coronary disease.

We have observed similar rapid changes in several conditions, such as acute nephritis, acute

pericarditis and diabetic acidosis. Similar observations in acute nephritis have been made by Master, Jaffe and Dack.<sup>10</sup> Recently we have seen

interpretation of the electrocardiograms in some cases might easily be entirely incorrect. In a few cases coronary occlusion, except for the chest lead, would undoubtedly have been suspected. In 1 case two electrocardiograms had been made a year previously. Re-examination of these records showed an increase in the electrical systole, although at that time the clinical diagnosis of vitamin deficiency was not made, apparently because it was not considered in the differential diagnosis. Increased electrical systole is common to all these cases. Barker, Johnston and Wilson<sup>11</sup> have reported a series of cases showing increased electrical systole which they attribute to hypocalcemia. We have observed a case of acute nephritis, without vitamin deficiency, in which the electrical systole was increased but the blood calcium was normal.

T-wave changes, as described, may be caused by several conditions, and it is necessary, in interpreting electrocardiograms, to know the clinical findings.

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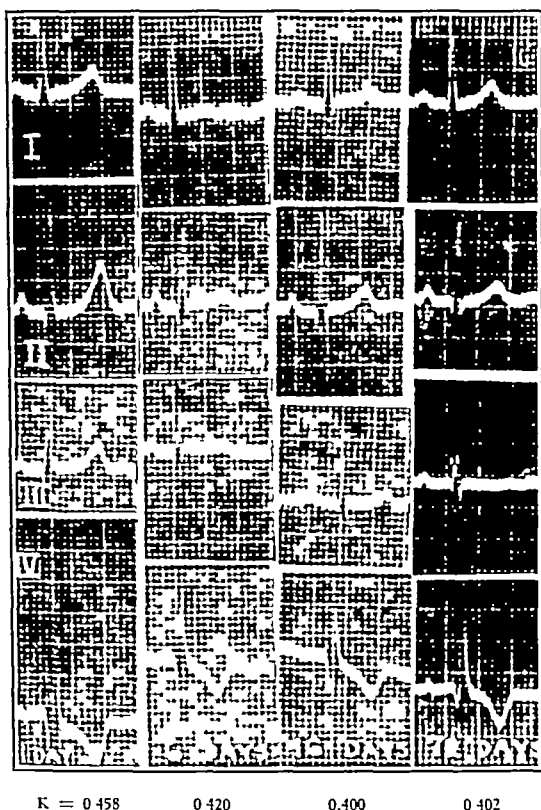


Figure 7 Case 6

Note abnormal height of early T waves and later average size (precordial leads by old method)

rapid T-wave changes in a man suffering from hemophilia and a traumatic hemopericardium.

If the clinical conditions were not known, the

## A JACKET FOR THE TREATMENT OF SCOLIOSIS\*

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AN appliance designed by the writer for the treatment of scoliosis, after having been in use for nine years, has proved to be efficient both as a corrective and as a supportive measure (Fig 1)

This brace, while embodying the same principle of overcorrection as does the Abbott jacket, has certain advantages that make it a more acceptable

ent, the existing curve can be lessened, if not actually corrected (Figs 2 and 3) An improvement in balance can also be established by the development of secondary curves, the brace meantime preventing the sagging or increase of the primary curve that results in a loss of height (Figs 4 and 6) The possibility of correcting, or at least of preventing, the increase of early scoliotic curves

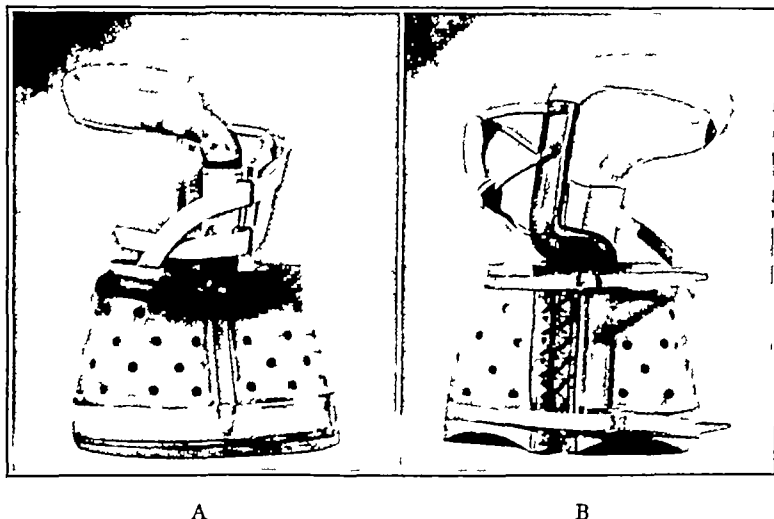


Figure 1 *Brace for the Treatment of Scoliosis*

form of treatment In the first place, the brace is applied with the spine extended, rather than in the flexed position necessitated by the Abbott technic Secondly, pressure is exerted by means of a flexible elastic strap rather than by plaster of Paris As the result of these modifications, discomfort from the position, as well as an unsightly appearance, is avoided, furthermore, there is no compression of the chest, distortion of the abdominal organs or interference with the circulation The brace can be worn under the regular clothing and be kept on at night On the other hand, it is easily removed to permit bathing and exercise Because of the light construction of the appliance, patients do not complain of its being uncomfortable during warm weather

Treatment by means of this jacket is most efficacious in the years of active growth, that is, between the ages of ten and fourteen In the early stage of scoliosis, when the spine is still flexible and only slight accommodative changes are pres-

ent, the existing curve can be lessened, if not actually corrected (Figs 2 and 3)

and of establishing better balance is a plea for the early recognition of these cases

In the later stages, when the curve is fixed and cannot be corrected, further strain and slumping can be prevented by the use of the brace In these cases, care must be taken that the patient wears the brace for a sufficiently long period The brace has been used successfully in controlling the development of curvature in cases of infantile paralysis, but, again, the corrective efforts must be long continued The jacket works well in cases of scoliosis that eventually come to operative fusion Before fixation, the curve is corrected and the balance improved as much as possible by the use of the brace, and following operation, the brace is used to secure the maximum correction while fusion is taking place (Fig 5)

A plaster-of-Paris cast is used as a model for the construction of the jacket This cast is taken with the patient standing, while a head piece exerts slight traction The arm on the low side of the body is raised straight in the air, taking

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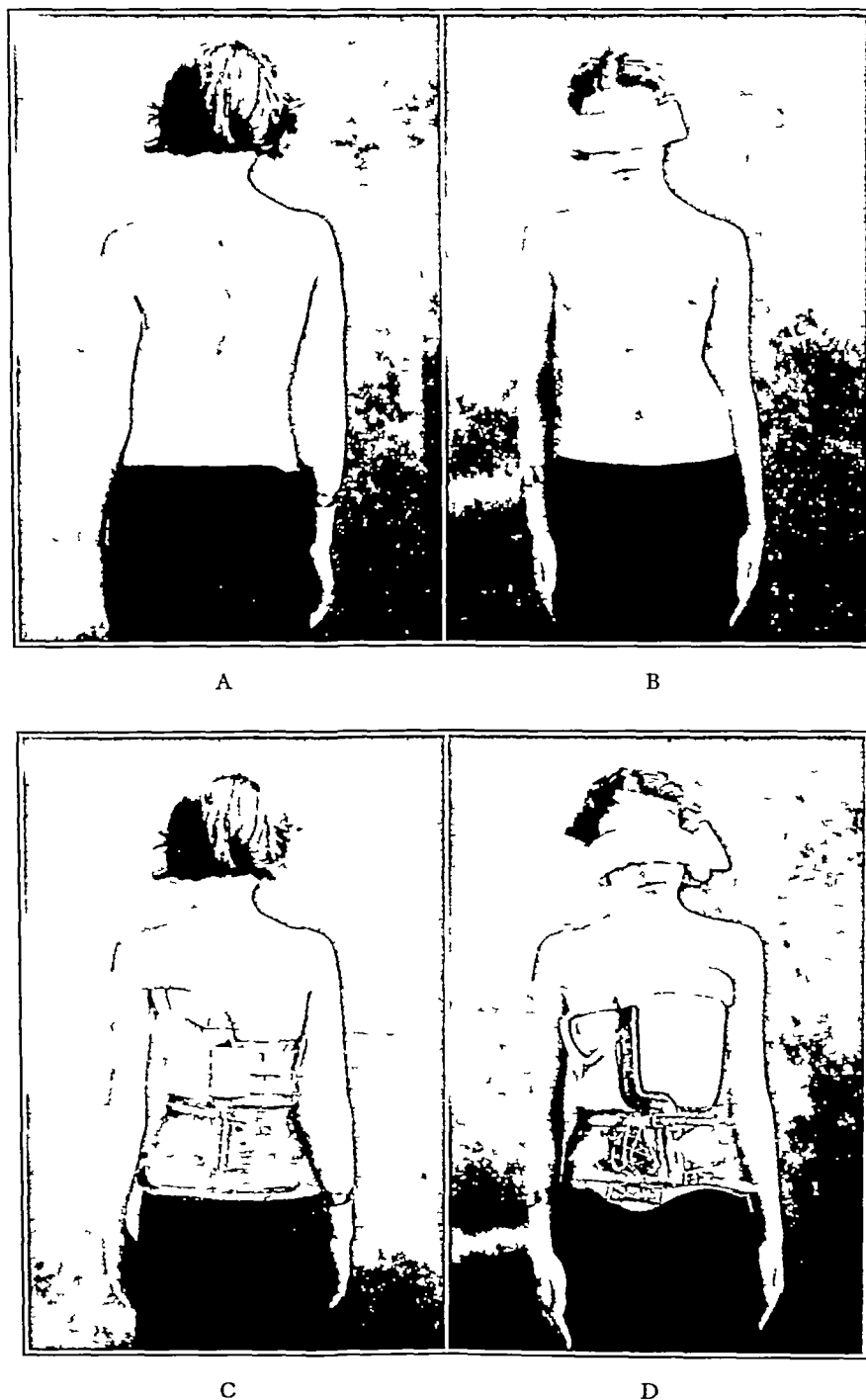


Figure 2. Application of Brace (Case M M)

A shows correctible curves of the spine before treatment, B, the asymmetry of the chest before treatment, C, the spine in corrected position and D, the improvement in the symmetry of chest

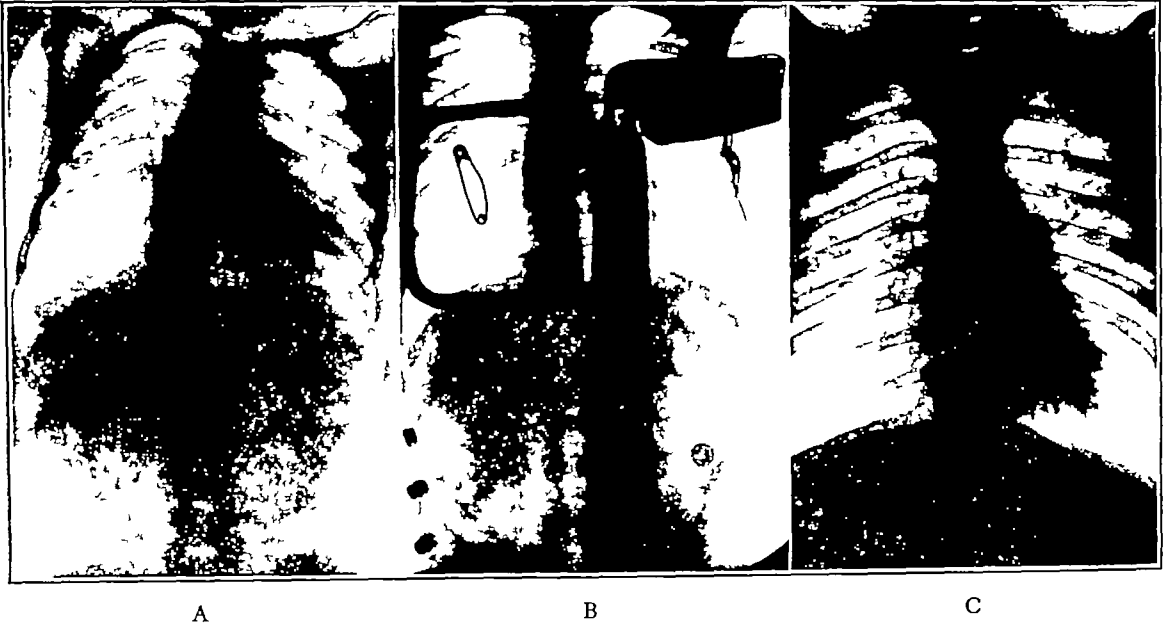


Figure 3 X-Ray Photographs of Case J O

A shows the primary spinal curve B, the correction of the curve by the brace and C, the end result six years after the beginning of treatment



Figure 4 X Ray Photograph of Case L G

This shows the end result of holding a dorsal curve by the brace during the actively growing years while a secondary curve developed. Note that both curves are about equal in size



Figure 5 X Ray Photograph of Case N F

The spine is being held in the corrected position while fusion takes place

a part of the body weight, and the other is held at an angle of 45 degrees to the body

The brace is so constructed that absolute rigidity—a most important factor of an appliance of this kind—is obtained. A pelvic girdle of leather that is bound top and bottom with steel

when it is pulled into place, exerts constant pressure over the point of greatest convexity of the curve. Both the lateral and rotary curves are influenced by this pressure.

Treatment by means of this brace must be carefully supervised. It must be worn until the patient



Figure 6 X-Ray Photographs of Case F M

*A was taken before the brace was applied to hold the dorsal spine while a secondary curve developed, note that the ribs are practically impinging. B shows the corrective effect of the brace note the separation of the ribs*

bands ensures fixation of the pelvis. Two steel uprights extend from this girdle, one from the back and one from the front. A heavy steel crutch that is 5 cm in width and reinforced with leather connects these uprights. The front upright has a goose-neck curve to allow the pelvic girdle to be laced in front. It is also equipped with an outrigger that is carried well forward of the chest to allow for expansion. To this outrigger and to the back upright is attached an elastic strap that is about 10 cm in width.

When the jacket is applied, the low shoulder is forced upward by the crutch. The elastic strap,

is beyond the flexible deforming age, and in some cases, two or three years may be necessary. While the brace is being worn, the customary therapeutic measures, such as exercise, are carried out.

During the past nine years, 76 patients have been treated by the application of this brace. Twenty-nine of these patients had flexible curves that were correctible. Forty-one had severe structural curves, and in these cases the brace was used to prevent further strain and sagging. In the treatment of a group of 6 cases of spinal fusion, the brace proved to be of decided advantage.

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## REPORT ON MEDICAL PROGRESS

### HODGKIN'S DISEASE AND ALLIED DISORDERS\*

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THE title of this review is intended to include Hodgkin's disease, lymphosarcoma, reticulum-cell sarcoma and the so-called giant-follicle lymphoma. The word "allied" should not imply that the various pathologic conditions are necessarily related in their etiology or, for that matter, in their pathogenesis. They are allied, if you will, merely because they are diseases primary in the lymphoid tissues of the body, because their etiology is as yet unknown and because they present similar clinical pictures and have a similar course. For many purposes, these conditions may be grouped under one general heading, that of malignant lymphoma. Where a finer distinction between the subtypes is of genuine value to the practitioner, mention of that fact will be made.

#### HISTOLOGY

Space does not permit a searching analysis of the histopathological characteristics of each type of malignant lymphoma. Each may, however, be briefly defined.

In lymphosarcoma, the lymph nodes or other organs are diffusely invaded by lymphocytes, mature or, more rarely, immature. There is often notable involvement of the capsule and extensive invasion of adjacent organs. The condition may exist in conjunction with lymphatic leukemia. Indeed, the interrelation between lymphosarcoma and lymphatic leukemia is so intricate and so unpredictable that the two diseases may well be regarded, for practical purposes, as one and the same.

In reticulum-cell sarcoma, the diseased organs and nodes are invaded and destroyed by large, pale cells with vesicular nuclei and scattered chromatin. These cells, distinctly larger than even immature lymphocytes, are actively ameboid and irregular in shape. The cytoplasm is faintly acidophilic and considerable in amount. Eosinophils are not found. Fibrosis is rare. Invasiveness is common and often extreme.

Hodgkin's disease may be profitably subdivided into three types: lymphoma, granuloma and sarcoma.

In Hodgkin's lymphoma, the architecture of the involved lymph nodes is diffusely replaced by

mature lymphocytes, among which are scattered a few, or more rarely many, typical Reed-Sternberg cells. There is neither eosinophilia, fibrosis nor necrosis. Careful study may be necessary to distinguish this form of Hodgkin's disease from lymphosarcoma. The differentiation is, however, of much practical importance.

The pleomorphic histological picture of Hodgkin's granuloma is familiar to all. There is fibrosis, often extreme, eosinophilia, necrosis with polymorphonuclear leukocytic infiltration, and, of course, typical Reed-Sternberg cells, without which the diagnosis cannot be properly made.

In Hodgkin's sarcoma, the involved tissues are invaded by large cells of uniform size and with considerable basophilic cytoplasm. The nuclei are round, and present characteristically a prominent nucleolus. There is neither fibrosis nor true necrosis, though dead cells may appear here and there. Eosinophils are not found. Some cells are multinucleated and there are scattered typical Reed-Sternberg cells, a *sine qua non* for the diagnosis, as in the case of Hodgkin's granuloma and lymphoma.

Hodgkin's lymphoma may with the passage of time take on the full histological characteristics of Hodgkin's granuloma. Furthermore, the latter may, more rarely, become malignant, excised tissue then showing areas indistinguishable from Hodgkin's sarcoma. We have fibroid phthisis, classic tuberculosis with cavity formation and miliary tuberculosis, so we have Hodgkin's lymphoma, Hodgkin's granuloma and Hodgkin's sarcoma. The prognostic implications of these finer subdivisions of Hodgkin's disease will be discussed subsequently.

In giant-follicle lymphoma,<sup>1</sup> the lymph nodes are studded in both cortex and medulla with large germinal centers composed of uniform, rapidly multiplying cells of uncertain origin. The absence of necrosis, polymorphonuclear neutrophils and phagocytosis serves to distinguish this condition from simple inflammation. This type of malignant lymphoma frequently progresses into one of the other varieties, whether it be Hodgkin's disease, reticulum-cell sarcoma or lymphosarcoma.

#### ETIOLOGY

The etiology of these diseases is unknown. There is still, indeed, much dispute as to whether

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they should be regarded as neoplastic or infectious<sup>2</sup> It is probable that lymphosarcoma and reticulum-cell sarcoma are true neoplasms and owe their origin to the obscure causes of such conditions The frequent presence of inflammatory processes close to the site of these tumors has led some investigators to believe that chronic infection may play a role in their origin On the other hand, it is thought by many that Hodgkin's disease is a true infectious granuloma Certainly, as Ewing has said, "Tuberculosis follows Hodgkin's like a shadow" It has never been established, however, that the tubercle bacillus is of etiologic importance For the present, the cause of malignant lymphoma in all its varied forms remains obscure

#### AGE INCIDENCE

Malignant lymphoma spares no age<sup>3</sup> There are certain important differences, however, in the age distribution of the various types Hodgkin's disease—whether Hodgkin's lymphoma or Hodgkin's granuloma—is very evenly distributed through the first six or seven decades It is virtually as common in the fifties as it is in the teens This fact is often overlooked

The age distribution of reticulum-cell sarcoma is quite different Very low in the first and second decades, the incidence rises rapidly and steadily to a peak in the sixth, only to fall as rapidly again A similar age distribution is found in the Hodgkin's sarcoma group—the incidence, in short, of malignant disease in general The lymphosarcomas show a high peak in the second decade (22 per cent of all cases) and a second peak in the late fifties and sixties (52 per cent of all cases) The disease is rare in the first and third decades Giant-follicle lymphoma may occur at any age

All forms of malignant lymphoma are commoner in men than in women

#### GROSS PATHOLOGY

The most important thing to remember in regard to the pathology of these diseases is that virtually any organ may be involved, either grossly or microscopically This simple fact explains the extraordinary protean character of the symptomatology of the malignant lymphomas In general it may be said that, with certain important exceptions, the lymph nodes are almost invariably enlarged, either in the cervical, axillary, mediastinal, abdominal or inguinal regions The spleen and liver are very commonly involved, and in decreasing order of frequency the pancreas, gastrointestinal tract, bones, skin, lung, heart, nasopharynx, breast, ovary and testicles Involvement of the central nervous system is not rare

Particular reference should be made to three

systems other than the lymphatic Secondary deposits in bone occur in some 25 per cent of all cases of Hodgkin's disease<sup>4</sup> Similar involvement is uncommon in reticulum-cell sarcoma, and rare in lymphosarcoma In Hodgkin's disease, the initial symptom may be due to destruction of bone,—even in the absence of obvious lymph-node involvement,—and the unwary physician may attribute the attendant pain to some hypothetical orthopedic condition and so fail to recognize the fundamental disease More commonly metastatic bone lesions occur late in the disease Although they are usually painful, extensive destruction may occur without pain and be discovered only by routine x-ray examination

Malignant lymphoma of one form or another involves the gastrointestinal tract in approximately 25 per cent of all cases<sup>5</sup> Such lesions are oftenest found in the stomach, duodenum or small intestine, less frequently in the large intestine or rectum Unfortunately they are frequently multiple, and only rarely does one encounter isolated lesions that are susceptible of surgical removal

Mediastinal involvement is frequent and well recognized It is not so commonly appreciated that there may be diffuse parenchymatous infiltration of the lung, which may simulate a chronic non-suppurative pulmonary lesion<sup>6</sup>

#### CLINICAL PICTURE

It is highly important to recognize that the clinical symptomatology of this group of diseases is a most varied one Almost any sign or symptom may appear By far the commonest initial symptom is a painless lump, most often in the neck, much less commonly in the axilla and rather rarely in the inguinal region There follows, in order of frequency, pain (commonest in the abdomen, back or legs), fatigue (unaccompanied by other symptoms), persistent sore throat, dyspnea, cough, fever, loss of weight, generalized itching and amenorrhea Rarer initial symptoms are hoarseness, pain in the chest, diarrhea, paraplegia, hemoptysis, hematemesis, nasal obstruction, tinnitus, edema of the legs, anorexia, vomiting, deafness and melena

The first symptoms vary in their relative frequency from group to group of the subdivisions Eighty-five per cent of patients with Hodgkin's lymphoma complain initially solely of a painless lump This symptom is present at onset in about three quarters of all patients with Hodgkin's granuloma, but in only one third of those with Hodgkin's sarcoma or reticulum-cell sarcoma Pain is never present at the onset of Hodgkin's lymphoma but is found early in some 10 per cent of Hodgkin's granulomas, 25 per cent of lymphosarcomas and Hodgkin's sarcomas and nearly 40 per cent of



reticulum-cell sarcomas These figures merely reflect the relative invasiveness of the individual types of lesions

The fact that the enlarged lymph nodes are so often painless, together with the fact that not infrequently they appear following an acute upper respiratory infection and not rarely decrease or even disappear temporarily with subsidence of the infection, often lulls both the patient and the physician into a false sense of security It must be remembered that in adults persistent enlargement of lymph nodes in absence of obvious cause is very rarely due to chronic inflammation alone

As has been intimated above, the symptomatology is extremely varied, and once the disease has set in almost any symptom or sign may arise Yet long periods of quiescence may follow appropriate radiation therapy, and this fact should not be construed as indicating actual freedom from disease

Certain special features of the clinical picture should be referred to Generalized itching without obvious cause may for some time be the only symptom of Hodgkin's granuloma It is occasionally accompanied by a gradually increasing generalized bronzing of the skin, most marked in the axillary and gluteal regions<sup>8</sup>

Skin lesions of the most diverse sorts may appear early or late in the course of any of the malignant lymphomas<sup>8</sup> The association of bizarre skin lesions with lymphadenopathy should always arouse suspicion that one may be dealing with some form of malignant lymphoma

Fever is common in Hodgkin's granuloma Indeed it is rare to have a case of this disease run its course without an increased temperature at one time or another Most frequently the fever is irregular, rising at night to 100 or 103°F and falling to normal in the morning Occasionally one encounters the so-called Pel-Epstein type of fever, in which the temperature rises daily over a period of a week or more, eventually reaching 103 to 105°F, and subsides as steadily and evenly to normal, only to rise again after a period of one or two months Gradually the episodes of fever become longer and the intervals of freedom shorter Once the temperature remains continually elevated, death is not far off Such fever may be for months the only sign of the disease<sup>9</sup>

The bone lesions so frequently appearing in malignant lymphoma have already been referred to Their x-ray appearance is not diagnostic Any bone lesion occurring in the course of generalized malignant lymphoma may properly be regarded as due to that disease Their advent in Hodgkin's disease is usually heralded by pain in the involved bone or referred to the nearest joint Occasionally

when the vertebrae are destroyed, paraplegia and cord-bladder result Bone lesions are of very serious prognostic importance, for death usually ensues about one year after their demonstration by x-ray except in cases in which the sternum is involved The latter may do very well indeed

Particular reference should be made to primary reticulum-cell sarcoma of bone<sup>10</sup> This condition, which has only recently been recognized as a clinical entity, may occur at any age Most frequently the long bones are involved, especially the femur, tibia and humerus The clavicle is also a not infrequent site. The disease has in the past been mistaken for osteogenic sarcoma, Ewing's tumor, osteomyelitis and syphilis The dangers of such erroneous diagnoses are obvious Pain is the commonest symptom The tumor grows quite slowly, and may reach massive size without seriously affecting the general health of the patient In no other bone sarcoma is the contrast between the well-being of the patient and the size of the lesion so marked The x-ray picture is not distinctive Early there is mottled rarefaction of the bone. Later there is massive destruction, often with pathologic fracture Although the tumor is radio-sensitive, it would appear that the most effective treatment is amputation followed by prophylactic radiation In 11 of 16 cases subjected to amputation the patients were alive and well from six months to fourteen years after onset Seven were alive and apparently free from disease ten years after onset<sup>10</sup>

#### LABORATORY EXAMINATION

Neither reticulum-cell sarcoma nor giant-follicle lymphoma gives any distinctive blood picture, although a moderate degree of normocytic anemia may be seen in the former

The relation of lymphosarcoma to lymphatic leukemia has already been alluded to Occasionally a case may start as a pure lymphosarcoma and, with the passage of time, develop the classic blood picture of lymphatic leukemia Much more rarely the reverse is true In the latter cases, usually as a result of intercurrent infection, the white-cell count falls to normal and the differential becomes normal In many cases of lymphosarcoma the percentage of lymphocytes in the peripheral blood is increased

In Hodgkin's disease—of whatever type—sooner or later there are almost always changes in the peripheral blood picture The white count is often moderately elevated (15,000 to 25,000) or more rarely depressed (500 to 3000) In either case the polymorphonuclear neutrophils are likely to be elevated They may be markedly so (85 to 95 per cent) In rare cases the monocytes are increased

to a high degree (15 to 50 per cent) Eosinophilia exists rarely. A definitely abnormal white-cell picture in Hodgkin's disease usually indicates that the condition is widespread. A normocytic normochromic anemia almost always develops as the disease advances. The red-cell count may fall as low as 500,000. Not infrequently levels of 1,000,000 to 2,000,000 are reached. In absence of acute blood loss, anemia of this degree is extremely rare in any other type of lymphoma.

In all types of malignant lymphoma, the basal metabolic rate is elevated if the disease be sufficiently widespread. Levels of +20 to +50 per cent are not unusual, and even +110 per cent has been recorded. Determination of the metabolic rate is therefore of some diagnostic value.

A biopsy of one of the lymph nodes should be done whenever feasible. Without such a diagnostic procedure no accurate diagnosis can be made, and an accurate diagnosis is always of practical value to both the patient and the physician. It is important, however, to observe certain rules. An entire node should be removed. Cutting into a lymphomatous mass or removing part of a node may spread the disease. It is important to remove a node of sufficient size to assure an adequate histological picture. Small satellite nodes frequently show only chronic inflammation. Most important of all is the question of tissue fixation. A poorly fixed and stained section is worse than useless. It is remarkable how difficult it may be to make even a tentative diagnosis from poorly fixed tissue, and how easy it may be to make a specific and definite diagnosis when the same tissue is adequately prepared. If possible the tissue, in thin slices, should be immediately fixed in Zenker's fluid, run through paraffin and stained with eosin and methylene blue. If the patient is to be sent to one of the larger medical centers for treatment, it is as well to defer biopsy until it can be done in the hospital to which he is referred.

#### TREATMENT

It is a moot point whether surgery should ever be attempted in the group of malignant lymphomas, except for primary reticulum-cell sarcoma of bone, already referred to. In this disease it would appear to be unquestionably indicated. Many authorities believe that malignant lymphoma is always a generalized disease and that surgical intervention with a view to cure is therefore contraindicated. If, however, a case of Hodgkin's disease, particularly of the lymphoma type, be sharply limited to one area in the neck, if the patient's general condition be good and if the peripheral blood picture, sedimentation rate and basal metab-

olism be normal, it would seem proper to attempt the complete removal of the involved tissue. Such a procedure has been known to have resulted in "cures" of fifteen to twenty years' duration, but these cases are few and even after this lapse of time one cannot be entirely sure that the patient is free from disease. Still, radical surgery is worth attempting in carefully selected cases. In expert hands there can be but little danger. If the disease be truly limited and accessible, cure is possible.

X-ray therapy remains the standard method of treatment. The details of dosage should be left to the radiologist. There is some difference of opinion as to whether only obviously involved areas should be treated or whether all lymph-node-bearing regions should be subjected to radiation even though they do not appear to harbor any pathologic lesion. Jacob, Peirce and Hildreth<sup>11</sup> and Desjardins<sup>12</sup> advocate the latter or generalized form of therapy. The majority of workers believe that radiation should be applied to diseased areas only. The usual custom is to give from 200 to 800 r at 250 kilovolts in divided doses to the involved regions, repeating this dosage only when and if further indications arise, either by symptoms or by signs. In treating very large lymphomatous masses, especially those in the neck, mediastinum or abdomen, considerable caution must be exercised, for the first reaction of the diseased tissue is to swell, and thus strangulation may occur, furthermore, the rapid destruction of a large mass may flood the system with catabolic products capable of producing profound deleterious effects.

If there be marked anemia, blood transfusions must be resorted to before x-ray therapy is undertaken. The existence or development of leukopenia calls for extreme caution in radiotherapy.

Many authorities have held that x-ray therapy does not prolong life. This may be true if one considers only the average of a large series of treated and untreated cases, but there can be no doubt whatever that in individual cases life is materially prolonged,—this is particularly true of mediastinal involvement,—and Peirce, Jacob and Hildreth<sup>11</sup> appear to have shown conclusively that the life of even the average patient is materially longer after appropriate treatment. It may therefore be said that radiation is of very real and practical value, but that the details of such therapy should be left to a competent and experienced radiologist.

One must not lose sight of the fact that general medical care is of distinct value. Adequate food and plenty of fresh air and rest undoubtedly help. Iron in the form of ferrous sulfate is indicated in

the presence of anemia, although one should not anticipate any startling benefit unless there is an accompanying iron deficiency due to inadequate diet, bleeding or poor absorption. All obvious foci of infection should be removed and the greatest care taken to avoid any upper-respiratory infection. There is some evidence that vitamin D in large doses may be beneficial.

#### PROGNOSIS

In the average case of malignant lymphoma the patient lives two and a half years from the onset of symptoms. But no individual patient is the average, and, as has been indicated above, the various types of lymphoma carry with them quite different prognoses.

The average duration in the case of lymphosarcoma is slightly over two years, 80 per cent of the patients are dead within three years, very few survive more than ten years, although approximately 20 per cent live from three to ten years after onset.

Similarly, the average life of patients with reticulum-cell sarcoma is somewhat less than two years, and 17 per cent live from three to ten years, yet 2 per cent are alive and apparently free from disease from ten to twenty years from onset. Into the latter group fall patients with primary reticulum-cell sarcoma of bone appropriately treated.

In Hodgkin's disease, we find the most interesting data as to prognosis. The average duration of life from the first symptom in Hodgkin's lymphoma is two and a half years, yet nearly 30 per cent survive five years or longer, and nearly 20 per cent ten years or longer. In contrast, the average case of Hodgkin's granuloma lasts but a scant two and a half years and very few patients survive for over ten years, nearly three quarters are dead within three years. No individual with

Hodgkin's sarcoma has in our experience survived a three-year period, the majority are dead within a year. This fact is entirely in accord with the neoplastic and invasive character of the condition.

It is difficult to give with any degree of accuracy the duration of the disease embraced under the term giant-follicle lymphoma, since this type so often progresses into one of the others, at which time it of course takes on the prognostic implications of that type. In general, however, it may be said that cases of giant-follicle lymphoma have a better prognosis than the other types, save only Hodgkin's lymphoma. The average duration is four years, many patients live from six to twelve years.

\* \* \*

Malignant lymphoma is a protean disease whose signs and symptoms are legion. The intermittently progressive course may be prolonged and the symptoms alleviated by appropriate treatment. True cures, if they occur, are rare, yet this fact should not prevent our using to the fullest extent all those measures now at our disposal for combating this dread condition.

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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25011

#### PRESENTATION OF CASE

A fifty-two-year-old, white, married bus driver was admitted complaining of epigastric pain.

Four and a half months before admission he experienced the gradual onset of a sensation of pressure under his xiphoid and fullness after meals. Increasing constipation began at the same time. He gradually stopped heavy foods and overeating and drank more and more milk. Activity made him feel quite well, whereas resting gave an increased sense of pressure in the epigastrium. Four weeks preceding entry pain was first noted in the form of steady, severe epigastric pain about two hours after meals, when he believed he could not take food. Hot water bottles gave him the most relief. During this time his stools were yellow, never bloody or tarry. Two weeks before admission he noted increased gaseous distention and at 2 a.m. was awakened by pain which was not relieved until the hot water bottle had been applied for a half hour. This pain recurred from time to time. It did not radiate, did not extend to the back or shoulders and was not cramping in nature. The patient worked during the last week and on the fourth day developed an upper respiratory infection. Three days before entry he saw a child killed, this completely unnerved him. He had not vomited and had not had jaundice or abnormal stools. He had had no urinary symptoms.

For the past six months he had been relatively deaf in the right ear but had had no symptoms of otitis. Two years before he had had a transurethral prostatectomy, and eight years before that a tonsillectomy. At the age of seventeen years he had had typhoid fever.

Physical examination showed a thin, chronically ill man with evidence of weight loss. A hard 2 cm. nodule was palpated in the region of the left anterior cervical lymph nodes. Both the infraclavicular and supraclavicular fossas were depressed. Examination of the chest was negative. The blood pressure was 100 systolic, 65 diastolic. There was moderate tenderness over the midepigastrium, but no palpable masses or organs. Rectal

examination was negative. The extremities were negative.

The temperature was 100.6°F, the pulse 110, and the respirations 20.

The urine examination was negative. The blood showed a red-cell count of 5,000,000 with 90 per cent hemoglobin, and a white-cell count of 17,000 with 80 per cent polymorphonuclears, 18 per cent lymphocytes and 2 per cent mononuclears. The serum nonprotein nitrogen was 19 mg. per cent, the protein 5.8 gm., and the chlorides were equivalent to 98 cc. of N/10 sodium chloride. A blood Hinton test was negative. Gastric analysis on two occasions showed no free acid, even after histamine. Four stool examinations were guaiac positive.

X-ray films of the gastrointestinal tract showed an irregular swelling involving the prepyloric region of the stomach, as well as the first and second portions of the duodenum. The third portion showed some swelling in its proximal portion. Questionable ulceration was present in the second portion. There apparently was ulceration in some of the involved areas, particularly in the lower part of the second portion of the duodenum where there was an irregular cavity, filling only at times. The third portion was at times narrowed and when filled showed an apparent pressure defect on the outside. The adjacent loop of jejunum showed localized swelling. This lay several loops distal to the ligament of Treitz but in close proximity to the third portion of the duodenum. The involved area was sharply defined and was approximately 7 cm. in length. This part of the jejunum was rigid and its mucosal pattern destroyed, apparently due to ulceration. Its position was fixed. There was probably an extraluminal soft-tissue mass pressing on the duodenum. Transport through the small intestine was delayed. The ileocecal valve was not reached at the end of five hours.

On the fifth hospital day the patient vomited some greenish coagulated milk. On the tenth day a walnut-sized node was palpated in the right lateral chest wall. He vomited again on the tenth night. The stools were guaiac positive. He was having no pain. On the thirteenth day he had a chill and epigastric pain, and felt weak and feverish. The pain did not radiate to the shoulders. The temperature was 102°F. The abdomen was tense. He vomited, but the vomitus did not contain blood. The following day he vomited 200 cc. of greenish liquid. During the next two weeks his temperature varied between 98.6 and 102°F daily. His condition remained essentially unchanged.

On the thirty-third hospital day an operation was performed

### DIFFERENTIAL DIAGNOSIS

DR WALTER BAUER From the history alone one can say that we are dealing with a man of fifty-two years of age who had symptoms referable to the upper gastrointestinal tract. There were no symptoms of obstruction. However, it should be pointed out that this man finally placed himself on a diet of soft-solid food and liquids. I gathered that milk had constituted the greatest portion of his dietary. This may be one reason for there having been no symptoms suggesting obstruction. The location of the pain and its character are of no help in deciding in favor of one lesion of the upper abdomen as compared with another. It evidently was a constant pain. My impression is that the pain was more like that encountered in cases of infiltrating lesions of the wall of the stomach or intestine. From the history alone I should have considered cancer of the stomach, ulcer, gastritis and perhaps pancreatitis or cancer of the pancreas as diagnostic possibilities.

From the physical examination we learn that he had lost weight, that a nodule was felt at the lower end of the chain of anterior cervical lymph nodes and that the stools were guaiac positive. With this information one might reasonably conclude that he was dealing with an ulcerating lesion of the gastrointestinal tract. The presence of the nodule plus the weight loss favors the presence of cancer of the upper gastrointestinal tract rather than that of a gastritis or a gastric or duodenal ulcer. The nodule felt in the neck was evidently an enlarged, firm lymph node but not the typical sentinel gland of cancer of the thoracic or abdominal cavity. This finding does not help us appreciably because the patient was of the age group where it is commonly encountered. It may be used, however, as evidence in favor of cancer. I cannot see much reason to suspect that the symptoms in this individual were being caused by any type of infection, such as tuberculosis or regional ileitis. Syphilis might be suspected but it would be difficult to prove that we were dealing with a syphilitic lesion. The question to be answered is, What type of lesion did the roentgenologist observe in this man? From here on I think the differential diagnosis could probably be carried on much better by the roentgenologist than by myself. We must decide whether we are dealing with a malignant lesion of the upper gastrointestinal tract. If so, is it intrinsic or does it represent invasion from a neighboring organ?

I wonder if Dr. Schatzki would show us the

x-rays. I should like to know, first, whether the stomach emptied normally.

DR RICHARD SCHATZKI I do not remember whether it emptied normally. Certainly there was no obstruction at the pylorus. The peculiar thing was that this patient did not have a real pylorus. In other words there was no clear-cut narrowing between the stomach and the first portion of the duodenum, such as usually indicates the position of the pylorus.

DR BAUER Would you say there was involvement of the pylorus?

DR SCHATZKI There is a lesion involving the prepyloric region, and the greater portion of the duodenum, in fact all of it that one can see, that is, the first and second portions and the beginning of the third portion. Needless to say, this is a very unusual appearance. The second portion is perhaps slightly less involved than the first.

DR BAUER Can you point out the ulcer in the second portion of the duodenum?

DR SCHATZKI This area here is ulcerated. There is no mucosal pattern.

DR BAUER That is not duodenum, is it?

DR SCHATZKI It is the junction of the second and third portions of the duodenum. The peculiar thing about the first portion as well as the stomach and immediate prepyloric region is that there are what appear to be folds, but the folds are much thicker than they usually are in this area. They are also much more irregular, and the surface appears to be destroyed.

DR BAUER In other words you would say there is ulceration of a large portion of the mucosa of the duodenum.

DR SCHATZKI Yes, with marked swelling.

DR BAUER With involvement of the jejunum as well?

DR SCHATZKI The jejunum is involved here. The distal part of the third portion of duodenum is not involved and the upper region of the upper loop of the jejunum is not involved, but there is one loop which is in close proximity to the duodenum and shows involvement over an area of 7 cm., with definite destruction of the mucosa.

DR BAUER With an area in between that you think was normal, or was there contiguous involvement?

DR SCHATZKI No, not contiguous so far as the course of the intestine is concerned, though the involved loop was in close proximity to the diseased duodenum.

DR BAUER The disease involved the prepyloric region, the first and second portions of the duodenum and about 7 cm of the jejunum. Is that correct?

DR SCHATZKI Yes

DR AUGUSTUS S ROSE Was a barium enema done?

DR SCHATZKI Not to my knowledge

DR BAUER It would be a help to know whether a pressure defect did or did not exist

DR RICHARD H SWEET There was a definite pressure defect. The other films looked as though the duodenum were pushed aside

DR SCHATZKI You can see the defect around the involved loop, where it was pressed on by the soft-tissue mass. I think I ought to make that clear. This loop has a definite intrinsic lesion in addition to the definite mass that is around it

DR BAUER If I were to be absolutely honest I should be forced to say I cannot make a definite diagnosis. However, I shall proceed as though I could

It is obvious that we must try to decide whether we are dealing with an intrinsic lesion or an extrinsic one that has invaded the previously mentioned portions of the gastrointestinal tract. I do not believe that we have to consider the possibility of a prepyloric carcinoma very seriously, because extensive involvement of the duodenum and ileum does not occur in such cases. If we were to think in terms of cancer outside the gastrointestinal tract which has invaded the upper portion of the tract we should have to consider carcinoma of the gall bladder, pancreas or duodenum. If this patient had involvement of the duodenum secondary to carcinoma of the gall bladder or pancreas he probably would have been jaundiced. In addition we might expect to feel a mass. Primary carcinoma of the duodenum is a very rare disease. If it involves the second portion of the duodenum, it usually arises in the ampulla of Vater. If this patient had this type of lesion we should again have expected to have observed jaundice. The biggest argument in favor of either of these diagnoses is the fact that Dr Schatzki feels quite certain that he was able to demonstrate a pressure defect

I am inclined to stick to the possibility that we are dealing with an intrinsic lesion of the gastrointestinal tract and not an extrinsic one. The one diagnosis that best explains everything in this case is malignant lymphoma of the lymphosarcoma type, even though there is very little on physical examination to substantiate such a diagnosis. He did have one enlarged anterior cervical node and during his stay in the hospital developed a walnut-sized node on the chest wall. The

patient had a fever which is consistent with this diagnosis. He had a leukocytosis, and there were 80 per cent polymorphonuclear leukocytes. This diagnosis better explains the findings in this case than any other that I can think of. I shall say that this patient probably had a malignant lymphoma of the lymphosarcoma type involving the duodenum and a portion of the jejunum

I should like to hear further suggestions or comments

DR TRACY B MALLORY Would anyone care to suggest an alternative diagnosis?

DR BAUER A luetic lesion might be suspected. I can go no further

DR WYMAN RICHARDSON You can have intrinsic malignant tumors of a sarcomatous type other than lymphoma

DR BAUER Yes. I thought of the possibility of leiomyosarcoma because one does encounter cases with several such lesions in the gastrointestinal tract. I did not appreciate, however, that the lesions were quite as extensive as they apparently were in this instance

DR JAMES H MEANS I shall make a statement and must beg of you to believe that I am truthful. As Dr Bauer read this case I did not recognize it as one that I had recently seen. I did not become conscious of that until Dr Mallory handed me the clinical record just now. It seems to bear out what is apparently true, that it is sometimes easier to make a diagnosis from an abstracted record than from seeing the patient. I had no difficulty in making the diagnosis of lymphoma just now, but in looking over the complete clinical record it appears that when the patient went to operation after being under my care, I had not the faintest idea what the diagnosis was. So it would seem that the patient was actually more puzzling than the paper case that has been summarized for this meeting

DR SWEET I should like to elaborate on what Dr Means has said. One clinical aspect which is barely mentioned in the case history and on which our whole attention was focused for the subsequent two weeks was whether he had a penetrating ulcer. On one occasion the surgical resident was summoned to consider whether the patient had to be operated on immediately because he was so tender and had so much spasm in the right upper quadrant

DR BAUER Was this before or after this x-ray evidence?

DR SWEET I do not know. I think I was the first surgeon to see him, and at the time he had spasm and tenderness and all the clinical aspects of a penetrating duodenal ulcer. On going over the history and learning about the absent acidity

and other aspects of the case I considered a penetrating carcinoma, but we finally agreed that he must have a penetrating ulcer. I was ill for a period after that, and Dr Churchill saw him. He made a diagnosis of penetrating ulcer and decided that surgery was indicated after the lesion had quieted down.

The lesion did quiet down, and after a considerable period we operated and found what we thought from gross inspection was an ulcer of the first portion of the duodenum which had penetrated, almost perforated and had been walled off by the adjacent tissues. The liver and adjacent portions of the omentum were adherent and rather edematous, and inflammatory in nature. I thought the course of wisdom was not to disturb this. The astonishing thing was that in the retroperitoneal tissues and in the mesentery he had an immense amount of thickening and a great mass in the base of the mesentery, which was nodular. There were several isolated nodules which looked like enlarged lymph nodes. This mass extended from just above the promontory of the sacrum up along the aorta to the region of the duodenal loop and distorted the second and third portions of duodenum. I took out two lymph nodes, one of which was the size of a small walnut and appeared to be lymphomatous. I then did a gastroenterostomy because of what looked to me like potential, if not actual, obstruction at the pyloric region. I made diagnoses of retroperitoneal lymphomatous tumor and probable duodenal ulcer, which had penetrated. I could not be sure that the mass which I saw and felt in the duodenum was lymphoma.

DR BENJAMIN CASTLEMAN I think it is only fair to the X-ray Department to say that before the operation they made a diagnosis of lymphoma.

DR MALLORY It seems to me the most helpful point in the clinical findings was the total absence of acid in the gastric contents. I think that duodenal ulcer under those circumstances is impossible.

#### CLINICAL DIAGNOSES

Lymphoma of small intestine  
Duodenal ulcer with perforation and abscess?

#### DR BAUER'S DIAGNOSIS

Malignant lymphoma of the lymphosarcoma type, involving the pylorus, duodenum and jejunum

#### ANATOMICAL DIAGNOSES

"Hodgkin's sarcoma" of stomach, duodenum and jejunum

Operative wound anterior gastroenterostomy,  
enteroenterostomy  
Abscess of lung, right lower lobe

#### PATHOLOGICAL DISCUSSION

DR MALLORY We found multiple areas of lymphomatous involvement in the duodenum and jejunum. Two separate areas of jejunum were affected, and there was a considerable degree of erosion in both places at the time he died. However, the mass of retroperitoneal nodes that Dr Sweet noted and biopsied showed no evidence of tumor, and that is a point I think worth emphasizing. I believe that in every case of lymphoma of the gastrointestinal tract which we have seen the regional nodes have been very large but have never shown anything but inflammatory hyperplasia. You cannot biopsy a mesenteric lymph node from a case of lymphoma of the gastrointestinal tract and count on getting histological verification of the diagnosis. Such nodes always show simple inflammatory hyperplasia. That was the case here. The one other finding was a small abscess in his lung, which seemed to be of considerable duration, I think it very likely antedated the exploratory operation.

DR SWEET This man made a quite uneventful recovery so far as the operation was concerned. He was almost ready to go home when he had a massive hemorrhage which was the cause of his death. This to my mind tends to confirm the diagnosis because, in my experience, so many cases of lymphoma of the gastrointestinal tract have had massive bleeding.

DR GRANTLEY W TAYLOR Did the supraclavicular lymph node show evidence of metastasis at autopsy?

DR MALLORY We unfortunately did not examine it.

DR MEANS I think that it ought to be pointed out that the cervical lymph nodes should have been biopsied. That was the glaring error in this case.

DR MALLORY They would probably have been negative. In these cases where lymphoma is sharply localized to the gastrointestinal tract one usually does not find tumor elsewhere.

DR GEORGE A MARKS Is it possible to say that the tumor was primary in the duodenum, or was it all in the mesentery?

DR MALLORY It was in the wall of the bowel in all three areas, with some infiltration of the mesentery as well. We had an argument in the laboratory as to the histological classification of the tumor because it was rather undifferentiated. We thought it was probably so-called "Hodgkin's sarcoma."

## CASE 25012

## PRESENTATION OF CASE

A fifty-five-year-old, white, married Belgian bartender was admitted complaining of chronic, recurrent symptoms of peptic ulcer.

He was perfectly well until twenty to twenty-five years before entry when he developed mid-epigastric pain which occasionally extended through to the back, occurring after meals and regularly relieved by food or alkalis. He had periods of remission and relapse, the latter occurring usually in the early spring and late fall. X-ray films were taken from time to time, the first about twenty years before admission, the last a year before admission. Each time an ulcer was demonstrated. The last films demonstrated a "new" ulcer. During the summer before admission he had his usual remission and was well until six weeks before entry when his autumnal exacerbation began. A Sippy regime gave little relief. The pain was severe, especially at night, so that he could not sleep for more than two hours at a time. He had tarry stools on only one occasion, and this was attributed to medication. There had been no pain in the region of the shoulders or lower abdomen. He had had no nausea or vomiting, and his appetite had been good. He had lost no weight, his best weight being that on admission—170 pounds. Although he was a bartender he stated that he very seldom took a drink. He smoked a moderate number of cigarettes. His work had always been light. His family history was noncontributory.

Physical examination showed a moderately obese male in no distress. Examination of the head, chest, abdomen and extremities was negative. The blood pressure was 160 systolic, 100 diastolic.

The urine examination was negative. The blood showed a red-cell count of 4,880,000 with 90 per cent hemoglobin, and a white-cell count of 11,100 with 67 per cent polymorphonuclears. The non-protein nitrogen of the serum was 22 mg per cent, the protein 6.2 gm and the chlorides were equivalent to 100 cc. N/10 sodium chloride. A blood Hinton test was negative. A gastric analysis showed 55 units of free hydrochloric acid, and the contents were guaiac negative. A stool examination was guaiac negative.

A gastrointestinal x-ray series showed marked constriction of the lesser curvature of the stomach and a deep ulcer crater in the middle third of the lesser curvature, measuring 1.6 cm in depth and 1.7 cm in width. There was moderate surrounding induration, but the mucosa appeared normal except for convergence to the crater. There

was considerable spasm of the antrum and first portion of the duodenum, which showed a slight deformity without evidence of a crater.

During the first six days in the hospital the patient had pain only once or twice daily, which was much less severe than previously, his symptoms being well controlled by a bland diet.

On the eighth hospital day an operation was performed.

## DIFFERENTIAL DIAGNOSIS

DR MARSHALL K. BARTLETT I wonder if Dr Schatzki will show the films?

DR RICHARD SCHATZKI These pictures show exactly what the report describes—a large crater approximately 5 cm away from the pylorus. There is some induration around the crater such as you see in any large ulcer, as well as shortening of the lesser curvature, which is a sign of chronicity. There is also marked convergence of the rugae. In other words the gross picture is that of peptic ulcer.

DR BARTLETT Dr Schatzki has outlined the problem quite clearly. We have an ulcer on the lesser curvature, and we must decide whether it is benign or malignant. One of the interesting points in that regard would be to know whether this recurrent ulcer which this man had had for twenty years had always been in the same location or whether he had formerly had a duodenal ulcer and at entry had a gastric ulcer. I do not see that there is anything in the history that could lead us to assume he had two separate lesions. The only suggestive point is the statement in the history that the x-rays which were repeated periodically before admission showed a "new" ulcer shortly before entry.

What have we in favor of the lesion's being cancerous? We have the facts that he may have had an ulcer in this region for a long time, twenty years, and that he had a relatively large ulcer in the portion of the stomach where we know malignant disease is apt to occur. In favor of its being a benign lesion we have the facts that he was in good general health, had lost no weight, had no anemia and had free hydrochloric acid in normal amounts. The gastric contents were negative to the guaiac test, as was the stool. Of course both were single examinations and are not conclusive, but perhaps they are slightly helpful. In addition to that we have the x-ray evidence which seems to me to suggest a benign lesion rather than a malignant one. If it is malignant I suppose it is probably a carcinoma. It would seem to be more likely that this lesion on the lesser curvature is a benign ulcer.



DR HORATIO ROGERS I think that the dramatic change in the character of the symptoms and the failure to respond to medication, which had hitherto been successful, are points in favor of the lesion's being malignant

#### PREOPERATIVE DIAGNOSIS

Benign gastric ulcer

#### DR BARTLETT'S DIAGNOSIS

Benign gastric ulcer

#### ANATOMICAL DIAGNOSIS

Colloid carcinoma of stomach, with peptic ulceration

#### PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The patient was operated on by Dr Arthur W Allen, with a preoperative diagnosis of a benign ulcer. He found a large penetrating ulcer on the lesser curvature. He also found a very definite old ulcer in the duodenum with adhesions and marked scarring around it. He excised the stomach ulcer. Grossly it was almost the same shape as the lesion that you saw in the x-ray film. There was a very deeply penetrating rather narrow crater. Microscopically the mucous membrane on either side looks at first glance to be quite normal, but when one focuses down with high power on the undermined edges one finds that the underlying tissue is full of small, signet-ring cells filled with mucin, and there is

no question that it is malignant. The infiltration extends a considerable distance on each side of the ulcer, in fact I am doubtful whether the resection was extensive enough to have removed the growth.

The question comes up again as to whether this represents cancer developing in a chronic ulcer or is a primary carcinoma with a secondary peptic ulcer in the center of the lesion. I do not believe in this particular case it is possible to reach an absolute decision, but the base of this ulcer does not look extremely chronic. It is consistent with a lesion of a few months' duration but not, I should say, with one of twenty years' duration, and we have definite proof from the surgical exploration that he had an old duodenal ulcer. I am inclined to think he had a duodenal ulcer for twenty-five years and developed cancer of the stomach a few months before he came to operation. I do not believe there is any possible way in which the preoperative diagnosis could have been made, either clinically or by x-ray.

DR SCHATZKI How do you explain the marked scarring in the stomach, resulting in marked shortening of the lesser curvature? If it was a primary cancer we should not expect such changes in so short a time.

DR MALLORY This is a signet-ring, colloid carcinoma of the scirrhus type, which eventually produces linitis plastica. Fibrosis is a characteristic feature and characteristically contracts and stiffens the stomach wall.

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## REPORTS ON MEDICAL PROGRESS

In this issue of the *Journal* a new series of "Reports on Medical Progress" begins. The object of a review of this sort is to inform the general practitioner in regard to the newer, approved methods in the diagnosis and treatment of disease, but the members of the editorial board are of the opinion that the majority of our former progress reports failed in their purpose. Some chiefly consisted of a listing of titles, with no critical evaluation of the papers by the author of the review. Others called attention to methods of diagnosis and treatment that were in the experimental stage. While it is true that such reviews have their place in medical literature, the busy physician does not have the time to refer to the original articles, nor is he able to separate "the wheat from the chaff" in subjects with which he is unfamiliar.

The new reports, which will appear weekly, are limited to approximately three thousand words. They do not represent meticulous reviews of the literature, but rather those particular aspects of each subject that, in the opinion of the reviewer, — who has been carefully selected, — are of proved value to the general practitioner in diagnosis and treatment. A few references are included for the use of those who wish to read extensively. In other words, the reviews represent what authoritative persons would say in a series of informal talks.

All but seven of the men who were originally asked to contribute to the series have agreed to do so, for this the *Journal* is duly grateful. Each review represents time and effort on the part of the reviewer that are generously contributed for the purpose of furthering postgraduate medical education. Any suggestions from our readers in regard to the value, form or subjects of these weekly reports will be received with appreciation and interest.

## THE LEGAL STATUS OF CONTRACEPTIVE ADVICE IN MASSACHUSETTS

For many years Massachusetts physicians have sought to protect the lives and health of their private patients by giving them contraceptive advice when, in their opinion, pregnancy was temporarily or permanently contraindicated. It became evident however that a far from negligible proportion of the women of Massachusetts — those who had no private physician and who belonged to the "out-patient" class — were forced either to deny themselves to their husbands or to risk their lives or health by becoming pregnant.

In 1931 an attempt was made to amend the law so that physicians might be exempt from its restrictions when, in their opinion, there was good evidence that pregnancy might be dangerous to the patient's life or health. This attempt failed.

In 1932, after being advised by a well-known law firm that the legal restrictions would in all likelihood not be construed as applying to physi-

cians in the bona fide practice of their profession, the Birth Control League of Massachusetts was instrumental in establishing the Mothers' Health Office in Brookline. The office was conducted by a qualified physician, under the supervision of a board of medical consultants, advice was given only to married, non-pregnant women whose physical or mental condition contraindicated pregnancy. For five years this office carried on without molestation, patients were referred by the leading hospitals of Boston, by private physicians and by social agencies. By 1937 similar offices had been opened in Boston, Fitchburg, New Bedford, Springfield, Worcester and Salem.

On June 3, 1937, the Salem office was visited by the police, confidential records were taken and the physician in charge, the nurse and two social workers were arrested on the charge that they "did sell, lend, give away, exhibit or offer to sell, lend or give away instruments and other articles and drugs and medicine for the prevention of conception." The attorney for the defense did not deny that the defendants had done these things, but contended that the prohibitions contained in the statutes did not apply to physicians and to those working under their direction when contraceptive advice was given for the purpose of protecting health and saving life.

Judge Sears, before whom the case was tried, stated in effect that he had no doubt the defendants had been actuated by worthy motives, but that it was not within his power to interpret the law contrary to its obvious meaning. He therefore found all the defendants guilty. This decision was sustained in the Superior Court and was then appealed to the Supreme Judicial Court of the Commonwealth. Chief Justice Rugg, who handed down the decision, said "We think that such an exception cannot be read into our statute by judicial interpretation. The relief, here urged, must be sought from the law-making department and not from the judicial department of government."

The case was then appealed to the United States Supreme Court on the ground that the Massachusetts statutes violated the first article of the State Constitution of Massachusetts and the fourteenth

amendment of the Constitution of the United States. On October 10, 1938, the Supreme Court refused to review the case on the technical ground that there was a "want of a substantial federal question."

These decisions give to Massachusetts the distinction of being the only state in the Union in which the existing laws have interfered with the medical advice that a physician is entitled to give to his patients. A number of physicians in this state appear not to realize their significance. These rulings affect not alone marital happiness, the health of women and the well-being of children, but even more fundamentally, they strike at the right of the individual physician to use his knowledge for the benefit of his patients.

Possibly the existing statutes will be reinterpreted in the light of new test cases that place the basic issue more clearly and directly before the courts. Failing that, the law must be amended. In any event, the public must become better informed regarding the facts involved. Too many people believe that birth control predicates abortion, that the avoidance of dangerous pregnancy is merely a matter of self-control. The dissemination of contraceptive information belongs by right to the medical profession, it should not be bootlegged as it is now, nor have to be given by physicians in defiance of the law.

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## MASSACHUSETTS MEDICAL SOCIETY

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### SECTION OF OBSTETRICS AND GYNECOLOGY

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

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#### PLACENTA ACCRETA

Mrs. M. B., a thirty-four-year-old primipara, started to bleed February 4, 1936, three days after delivery.

The family history was essentially negative. The patient had had a ruptured appendix as a child, and her tonsils were removed twice. She had had the usual childhood diseases, including diphtheria. Catamenia began at thirteen, were

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

regular with a twenty-eight-day cycle, lasted four days and were unaccompanied by pain. Her last period was April 6, 1935, which made her expected date of confinement January 13. She had had no complications during her pregnancy, and a blood Wassermann test was negative.

After a normal, primiparous labor lasting about five hours and a half, she was delivered by simple forceps because of an unusual amount of bright show. This was subsequently found to be due to a partial separation of the placenta, as there was a clot adherent to the separated area. The placenta was delivered normally and was apparently intact. There was no unusual bleeding after delivery.

Three days later she began to bleed profusely, the hemorrhage was so marked that within an hour her blood pressure had gone down to 70 systolic. Five hundred cubic centimeters of glucose and 500 cc of her husband's blood were given before any attempt was made to ascertain the cause of the bleeding. On examination there was no bleeding from the cervix. Exploration of the uterus revealed a tongue-like piece of tissue hanging down from the posterior wall up toward the right horn. Part of this was removed by forceps and some was obtained by curet, the uterus was packed with an iodine strip. At the end of the operation her pulse rate was 100 and her color was satisfactory. No laboratory work was done on the patient's blood until two days later. At that time the hemoglobin was 35 per cent, the white-blood-cell count 19,400, and the red-blood-cell count 1,740,000.

The next day, February 7, she began to bleed again, but the hemorrhage was not profuse. However, since her blood pressure fell from 120 to 100 systolic during the next hour, hysterectomy was decided on. Transfusion was deferred until the end of the operation. No blood examination was made until the following day when the hemoglobin was 45 per cent, the white-blood-cell count 86,000, and the red-blood-cell count 2,820,000. She made a satisfactory convalescence, although she ran an elevated temperature for five days after operation.

The subsequent laboratory work on her blood was as follows: February 9, white-blood-cell count 53,000, February 10, hemoglobin 45 per cent, white-blood-cell count 18,800, red-blood-cell count 2,100,000, February 15, hemoglobin 50 per cent, white-blood-cell count 20,700, red-blood-cell count 2,860,000, February 21, hemoglobin 55 per cent, white-blood-cell count 13,500, red-blood-cell count, 2,900,000, February 26, hemoglobin 65 per cent, white-blood-cell count 8,800, red-blood-cell count 3,620,000.

### The following is the pathological report

The specimen consists of a postpartum uterus, fixed in formalin, which has been opened anteriorly by a midline vertical incision. The specimen measures 12 cm in width, 12 cm in height and 6.5 cm. in thickness. The myometrium is of normal color and consistency for a formalin fixed postpartum uterus. The myometrium measures 2.5 cm in thickness. The placental site is at the fundus, mostly posteriorly. There are irregular, small masses of placental tissue, the largest of which is 2 cm in diameter and is located in the region of the right cornu. There are thrombosed sinusoids in the immediate neighborhood of the placental site, which in the fixed condition and the contracted state of the uterus measures approximately 5 cm in diameter. The rest of the lining of the uterus, composed of decidua vera, is dirty greenish grey and of irregular contour. On gross examination, the findings



Figure 1 Section through Placental Site ( $\times 17$ )

suggest those of placenta accreta, particularly in view of the fact that the spongy decidual reaction appears to be very slight in the right cornu. Multiple vertical incisions in the uterine wall reveal no other areas of adherent placental tissue. On microscopical examination, a section taken from the region of the right cornua and one somewhat removed from there, both show adherent placental tissue (Fig 1).

Diagnosis: postpartum uterus, with evidence of retained placental tissue (placenta accreta).

**Comment** Postpartum hemorrhage that occurs a few hours or longer after delivery must always be due to one of two conditions: the slipping of sutures placed in a torn cervix or repaired perineum, or uterine bleeding due to retained placental tissue, possibly an accreta. The diagnosis cannot be made except by examination. In this

case there was no bleeding from the episiotomy wound and the cervix had not been sutured at the time of delivery, hence the bleeding must have come from the inside of the uterus

The commonest cause of postpartum uterine bleeding is a cotyledon or a succenturiate placenta that is adherent and not expelled at the time of delivery, but a placenta accreta is sometimes found to be responsible. The diagnosis rests on intrauterine investigation. In this case examination proved that retained placental tissue was the cause of the bleeding, and since this could not be removed either by the finger or by instrumentation, it was inferred that a partial accreta existed. The packing of the uterus was done to control subsequent bleeding and also in the hope that this piece of placental tissue might be normally extruded. Subsequent hemorrhage, however, made operation necessary, and hysterectomy seemed to be the only means of adequately controlling the bleeding and of removing the cause at the same time. It was unfortunate that the uterus had to be sacrificed in a woman only thirty-four years of age, but pathological examination proved this to have been the intelligent procedure

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning January 9

##### BRISTOL SOUTH (New Bedford Section)

Friday, January 13, at 4 00 p m, at the St. Luke's Hospital, New Bedford. Subject—Sepsis. Instructor A Gordon Gauld. Robert H Goodwin, *Chairman*

##### WORCESTER

Tuesday, January 10, at 8 30 p m, in the Nurses Home of the Milford Hospital, Milford. Subject—The Control and Treatment of Respiratory Infections. (This is to include the serological treatment of pneumonia in infants and children.) Instructor Charles F McKhann. Joseph Ashkins, *Chairman*

#### A MEANS OF IMPROVING THE DISTRIBUTION OF MEDICAL CARE IN MASSACHUSETTS\*

We have of late been hearing much to the effect that the executive branch of our federal government seems committed to a policy which would greatly enlarge government's participation in the care of the sick. This is food for deep and earnest thought, particularly as some of the changes contemplated call for a radical and revolutionary departure from the present control of the distribution of medical care.

We may ask ourselves two questions as touching on the wisdom of these new proposals. First, Is the present

\* Green Lights to Health broadcast given by Dr. Michael A. Tighe on Wednesday, December 14 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

set up of medical care so basically wrong and so outdistanced by the present social order that even its modification will not suffice? Secondly, Is there a middle road which, while preserving all that is good in American medicine, will at the same time take due notice of its shortcomings and voluntarily seek the means of their correction? The great majority of the people, who have thought of this matter at all, earnestly desire and hope for the accomplishment of this latter. May I present to you today a program which bids fair to bring about this very desirable end?

This program is founded on the studies of the Massachusetts Medical Society as to the present medical needs of the people of our state. There has come from these studies the firm conviction that, whatever may be the condition in certain other parts of our country, there is today in Massachusetts no serious lack of medical facilities. The problem has almost entirely to do with such improvement in the distribution of our present facilities as will make them more readily available to all. This implies, in the first instance, a program of public education in the value of good health. This program should start with the child and continue as a very important part of his school curriculum. If further emphasis is needed as to the importance of this latter, let me point out that our studies showed that, of those inadequately cared for in Massachusetts, nearly half were poorly cared for because of their own indifference. It appears that it is not enough merely to offer free medical care to those who cannot afford to pay for it. An appetite for good health must be created. A bounteous meal means nothing to the man who has no desire to eat.

This matter of educating boys and girls in the value of good health and in the means of preserving it does not involve the setting up of any new machinery. Rather does it seek to place greater emphasis on, and to promote a greater utilization of, machinery already existent. Massachusetts school systems have, for approximately three decades, provided for the medical inspection of the children in their keeping. The greater utilization of this machinery along the lines of educating these children in the value of good health is an opportunity for closer co-operation between school authorities and their medical personnel.

The medical needs of the indigent should be supported out of tax funds just as the food, clothing and housing needs are now provided. The indigent patient should be treated as an individual patient by the doctor of his own choice. The payment for such services should be by agreement between local welfare authorities and local medical societies. I know full well that the responsibility for the medical care of the poor is the traditional role of the doctor. In this crisis through which we are passing however, this load lays a heavy burden on a profession which is already supplying its proportional share of direct and indirect tax funds. This double system of taxation has for many about reached the point of exhaustion. This responsibility belongs to the whole people, and not to any particular group.

The principle of insurance against the unpredictable hazards of life should be utilized by the low income and moderate income groups as a means of financing the cost of their medical care. These groups represent the great bulk of our population. The practice of doctors to scale down their charges to meet these lesser pocketbooks has, we are told, not met the whole problem. Neither is it enough to say that those with such incomes should budget in the ordinary way to meet the costs of sickness. Many of such incomes are so small as to make the ordinary type of budgeting impossible. Again, if we are to be practical

in this matter we must admit that the number of people who do and who will budget to care for such an unpredictable thing as sickness is very small indeed. Rarely does the individual anticipate being ill. Illness is for the other fellow and not for him.

Hence, another type of budgeting to meet the costs of illness becomes necessary—a painless type of budgeting, a type of budgeting which, while recognizing the demands of pressing and immediate needs and the lure of the many useful things which go to make up American life, still may set aside weekly, in an insurance system, the price of a movie as the premium to pay for adequate medical care.

Part of the machinery for bringing this about has already been set up. The Associated Hospital Service Corporation began its operations a little over a year ago. This is a non-profit organization authorized under a special act of the Massachusetts legislature. The organization is already meeting the problem of hospital costs for many thousands of our people. The selection of the policyholder under this contract has been careful—too careful is the criticism of many. It must be remembered, however, that this was virgin soil and that the interests of the policyholder must be protected against any contingency. An examination of the financial reports of this Massachusetts corporation and of others, notably that of New York, shows how rapidly a surplus against any contingency is being built. This having been accomplished there are three ways in which such an organization may expand: first, by lessening the premiums—the premiums are, however, already within the reach of all; second, by increasing the service—the service is already adequate, with many comforts thrown in; third, by lessening some of the restrictions which are at present thrown around its membership. This last would seem to be the way of expansion for an organization whose whole purpose is to supply in a painless way the hospital needs of the people.

The newer part of this program calls, in part, for the immediate creation of an insurance system which, for a small premium, will meet the policyholder's doctor's bill. This latter system might very well be set up on much the same basis as that of the Associated Hospital Service Corporation. It should, however, be a distinct organization. It should preferably be non-profit, with the policyholder getting the benefit of whatever earnings the organization shows above and beyond that surplus necessary to maintain its financial soundness.

And finally the program demands the formation of a health council in each community. This council should be made up of all those agencies having to do with the distribution of medical care—hospitals, nurses, doctors, welfare and health organizations and social service units. This type of committee would be in the best position to study and to know local needs, and the manner and means by which the rest of the program can be made to fit those needs.

This program has the endorsement of the Massachusetts Medical Society, the American Medical Association, the American, Catholic, and Protestant hospital associations and their subsidiary affiliates.

MR CHARLES E. GALLAGHER\* This is a splendid program, Dr Tighe. I like its simplicity, and its comprehensive nature. Your emphasis on health education is well placed. None of us laymen know enough, or think enough, of the means of preserving our health. I quite agree with you that this type of education should start in the impressionable days of childhood.

I like your thought that the poor man should be cared for as an individual by the doctor of his own choice. This

is the kind of medical care I want, and I can desire no less for him.

That part of the program which provides the means by which those with moderate incomes may easily finance their medical needs is bound to have great public support. The alacrity with which the people have accepted the plan of the Associated Hospital Service Corporation and the practical way in which it is working out are, in my opinion, a fair index of how this second part of the program—indemnity against doctors' bills—will be received.

The formation of community health councils is a splendid idea. I can well understand that the problem of the distribution of medical care may vary as the community varies. Who is in a more favored position to know the specific medical needs of a particular community than those who are actually engaged in the work of distribution?

I like the program as a whole because it is an attempt to assist the average man to help himself. I like it because it involves a minimal administrative cost—a guarantee that most of the dollar spent will accrue to the interest of the person spending it. I like it because it maintains the intimate relation between doctor and patient, with the initiative of that doctor to excel encouraged rather than discouraged. I cannot help but contrast a program of this character with the compulsory sickness-insurance plan as proposed by certain governmental agencies. I see in this latter an inevitably high administrative cost and the creation of an enormous political bureaucracy. For my part, I should rather that politics and political methods be kept out of the care of the sick.

## NOTICES

### REMOVAL

HENRY BORUCHOFF, M.D., announces the removal of his office to 192 Bay State Road, Boston.

AARON KAUFMAN, M.D., announces the removal of his office to 395 Commonwealth Avenue, Boston.

### TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10:00 to 12:30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium or high voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 p.m. on Thursday, January 12, in the Amphitheater of the Peter Bent Brigham Hospital, Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physics, Harvard Medical School and physician in chief, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.

### BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, January 11, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D. Secretary  
Medical Staff

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, January 10, at 8 15 p m., in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance) Dr E Stanley Emery will preside.

## PROGRAM

Presentation of cases

The Role of Intubation in the Study and Treatment of the Small Intestine. Dr W Osler Abbott.

Medical students and physicians are cordially invited to attend.

ROBERT ZOLLINGER, M.D., *Secretary*

## BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library, 8 Fenway, Boston, Monday, January 9, at 8 15 p m.

Dr Edwin B Dunphy will talk on "The Development of Our Knowledge of the Diseases of the Eye."

Members of the medical profession and other interested persons are cordially invited to attend.

PAUL D WHITE, M.D., *President*,

BENJAMIN SPECTOR, M.D., *Secretary*

## SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, January 17, at 12 o'clock noon.

Dr Thomas H. Ham will speak on "Laboratory Procedures in Hospital Practice."

Physicians are cordially invited to attend

JOHN B HALL, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JANUARY 9

## MONDAY JANUARY 9

\*4 p m Physicians and medical students are cordially invited to attend a clinic presented by the medical surgical and orthopedic services of the Infants and Children's hospitals in the amphitheater of the Children's Hospital

\*8 15 p m Boston Medical History Club Boston Medical Library

## TUESDAY JANUARY 10

\*9 10 a m Joseph H Pratt Diagnostic Hospital Clinical Value of Male Hormone Assays Dr C H Lawrence and Dr A C Moullyn

\*10 a m 12 30 p m Tumor clinic Boston Dispensary

\*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance)

## WEDNESDAY JANUARY 11

Eastern Section of the American Laryngological Rhinological and Otolological societies in conjunction with the New England Oto-Laryngological Society Massachusetts General Hospital

\*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser

\*12 m Clinicopathological conference Children's Hospital amphitheater

12 m Boston City Hospital Monthly clinicopathological conference pathological amphitheater

## THURSDAY JANUARY 12

8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Surgical

9 10 a m Joseph H Pratt Diagnostic Hospital An Unknown Hereditary Dyscrasia of the Blood Dr H G Brugsch

\*3 30 p m Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY JANUARY 13

9 10 a m Joseph H Pratt Diagnostic Hospital The Diagnostic Importance of Pain Referred from the Digestive Tract Dr C M Jones

\*10 a m 12 30 p m Tumor clinic Boston Dispensary

## SATURDAY JANUARY 14

\*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser

\*10 a m 12 m Staff rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY JANUARY 15

4 p m Illustrated public health lecture Faulkner Hospital and auditorium The Surgical Treatment of Stomach and Duodenal Ulcers Dr Edward L Young Jr

4 p m Free public lecture, Harvard Medical School amphitheater of Building D The Skin What it does and the care it needs." Dr C Guy Lane

Open to the medical profession

JANUARY 8—Lecture at the Faulkner Hospital Page 971 issue of December 15

JANUARY 8—Free Public Lecture Harvard Medical School Page 1056, issue of December 29

JANUARY 8—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29

JANUARY 9—Boston Medical History Club Notice above.

JANUARY 10—Harvard Medical Society Notice above

JANUARY 11—Boston City Hospital monthly clinicopathological conference, pathological amphitheater Page 41

JANUARY 11—Eastern Section of the American Laryngological Rhinological and Otolological societies in conjunction with the New England Oto-Laryngological Society Massachusetts General Hospital

JANUARY 12—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill

JANUARY 12—Peter Bent Brigham Hospital Clinic conducted by Dr Christian Page 41

JANUARY 17—South End Medical Club Notice above.

FEBRUARY 4 MAY 15 and 16—American Board of Obstetrics and Gynecology Page 451 issue of September 22 (Application for admission to Group A examinations must be on file in the Secretary's office by March 15 instead of April 1 as previously stated)

MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 1013 issue of December 22

MARCH 27 31—American College of Physicians Page 36 issue of July 7

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 15 16—American Board of Obstetrics and Gynecology Inc Page 937 issue of December 8

MAY 15 19—American Medical Association St Louis Missouri

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15 28—Pan Pacific Surgical Association Page 863 issue of November 24

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

JANUARY 4—Danvers State Hospital Clinic at 5 p m Dinner at 7 p m Speaker Dr Kenneth J Tillotson Subject. The Psychiatrist's Viewpoint in Delinquency

FEBRUARY 8—Essex Sanatorium Middleton Clinic at 5 p m Dinner at 7 p m Speaker Dr Edward Churchill Subject Surgical Treatment of Pulmonary Suppuration

MARCH 1—Lynn Hospital Clinic at 5 p m Dinner at 7 p m Speaker Dr John Rock Subject. Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

JANUARY 25—Symposium on Diabetes Dr Elliott P Joslin and associates Boston Medical Library 8 15 p m

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

## WORCESTER

JANUARY 11—Page 1057 issue of December 29

FEBRUARY 8—Worcester State Hospital

MARCH 8—Worcester Memorial Hospital

APRIL 12—Worcester Hahnemann Hospital

MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6 30 p m which is followed at 7 30 p m by the business and scientific sessions

# The New England Journal of Medicine

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NUMBER 2

## A NATIONAL HEALTH PROGRAM\*

WARREN F. DRAPER, M.D.†

WASHINGTON, DISTRICT OF COLUMBIA

YOU have come here, I believe, to find out what those who have been considering a national program of health have in mind, how it will work and what the results will be. I shall try to give you as much of this information as has been developed and can be supplied in a period of thirty minutes, and I shall make it as simple and direct as possible.

I assume that all of you know that proposals for a national health program have been made by an interdepartmental committee appointed by the President consisting of officials from the major federal departments most closely concerned with the provisions of the Social Security Act. A technical subcommittee on medical care was set up, and it was the report of the latter that formed the basis of the National Health Conference, which has stimulated nation-wide interest and discussion.

The purpose of the committee was to appraise the state of the nation's health and to arrive at conclusions as to what could and should be done to improve it. This was a logical course of action because in addition to the humanitarian elements involved, illness and death cost taxpayers money. The social security laws provide pensions for dependent children, some of whom may be made fatherless by the death of the bread-winner from tuberculosis or made motherless by death in childbirth. Pensions are paid for the blind. It is certainly not good business to pay pensions to persons made unemployable, dependent and destitute because of preventable illness without trying to do something to prevent the illness and restore the sick to health. This basic relation between health and economic welfare was recognized in the Social Security Act already in operation, and an annual appropriation of \$12,000,000 for the United States Public Health Service and the Children's Bureau was authorized to aid the states in their efforts to improve the public health. A beginning has

been made and commendable work is being done, but it will require a much greater effort to do what we know how to do along these lines.

We may take deep satisfaction in the brilliant advances that have been made in scientific knowledge and the practice of preventive and curative medicine. Our general death rate is the lowest on record. It has been reduced from 176 per thousand in 1900 to 11.5 in 1936, which represents a saving of about three quarters of a million lives in 1936 alone. During the same period, twelve years were added to the average expectation of life at birth. The saving, however, has been chiefly in the years of childhood and early adult life, when the preventable diseases are most frequent. Mortality in the higher ages has not in general been declining, and those who reach the age of fifty years or over have little reason to believe that they will live for more than a fraction of a year longer than if they had reached that age in 1900. In some of the important diseases of adult life the death rate has been increasing—in cancer, for example, and in diseases of the heart, blood vessels and kidneys.

Fine though the record has been, there are serious problems of health and medical care that yet remain to be solved, and new ones are constantly arising. It is with these and the possibilities of future accomplishments that we have to deal if unnecessary suffering and wastage of human life and resources are to be averted. Let us, then, review some of the findings that have been made, considering first those conditions within the field of public health for which known remedies are at hand.

### EXPANSION OF PUBLIC-HEALTH AND MATERNAL AND CHILD-HEALTH SERVICES

*Venereal Disease.* The venereal diseases of course constitute our greatest health problem. Of syphilis especially much information has been received

\*An address delivered at the New England Postgraduate Assembly, Cambridge, November 15, 1938.

†Assistant surgeon general, United States Public Health Service.



of late I shall recall only a few of the more important facts

A total of 518,000 persons newly infected with syphilis seek treatment each year. More than 1,000,000 seek treatment for gonorrhea. There are probably an equal number of sufferers from these diseases who do not seek treatment. Some 60,000 babies with syphilis are born each year. There are 40,000 deaths each year from syphilitic disease of the blood vessels and the heart, 80 per cent of which could be prevented by adequate treatment in the early stages. The cost of maintaining persons blinded by preventable syphilis is \$10,000,000 a year. About 10 per cent of the patients in our hospitals for the insane are there because of syphilis. The annual cost of their care is about \$31,500,000. Surgeon General Parran has stated that syphilis can be brought down to a small fraction of its present prevalence in a decade and essentially wiped out within a generation if the knowledge already available is effectively applied.

**Pneumonia** Pneumonia stands third on the list of the causes of death. An average of 96,500 persons died from this disease each year from 1930 to 1935. The death rate is highest among infants and children of the pre-school ages, and among persons in late-middle and old age. Nearly 600,000 persons are disabled from it annually. Current experiments in the mass prevention of pneumonia by protective inoculation give great promise of success. In serum treatment and other methods the means are at hand to reduce greatly the mortality of and disability from the disease, even after it has been contracted. However, the laboratory facilities and the serum necessary for this expensive life-saving treatment are available in only a very few places to those who are unable to pay the cost.

**Cancer** Cancer is second on the list of the causes of death, and claimed 143,000 victims in 1936. There are probably 400,000 persons in the United States today suffering from cancer. Under present conditions it is estimated that one of every eight persons who reaches the age of forty-five will die of cancer. Yet leading authorities have estimated that as many as 40,000 of these lives might be saved each year if all the patients received the benefits of modern methods of treatment, and if opportunity were provided for the diagnosis of a larger number of cases in the early stages.

**Tuberculosis** There are still about 70,000 deaths from tuberculosis each year. Forty thousand of these occur among adults between the ages of forty and forty-five. Those qualified to judge are of the opinion that the deaths can be reduced by 50

per cent through the health supervision of workers in occupations predisposing to the disease, through the detection of incipient cases and through the provision of adequate medical and institutional care in the early stages. Most cases are discovered too late for effective treatment, and far too many reach sanatoriums when the disease has advanced too far for a hopeful outcome.

**Diabetes** There are probably between 400,000 and 500,000 persons suffering from diabetes, with 30,000 deaths each year. If insulin can be made available to all those who need it, and properly administered with the other treatment indicated, deaths can be reduced and life prolonged.

**Maternal and Infant Mortality** Today there is a great and unnecessary waste of maternal and infant life. Physicians after careful evaluation of the causes responsible for the deaths of mothers report that at least half the 14,000 deaths of women which occur each year from causes connected with pregnancy and childbirth can be prevented. About 75,000 infants are stillborn, and almost an equal number die in the first month of life. These deaths are due in large measure to lack of adequate care of the mother during pregnancy and at delivery and of mother and infant during the postnatal period.

Experience has shown that piecemeal effort—a prenatal clinic or a public-health nurse here and there—is not sufficient to reduce this wastage in human lives. What is needed is for every expectant mother to be under the supervision of a good physician during the prenatal period, and to receive proper service at delivery and adequate medical and nursing attention for herself and her baby thereafter. It is the proposal of the committee that the funds to make this possible be made available to state and local agencies.

**Mental Disease** An estimated total of 500,000 persons are in hospitals for mental disease. The mentally diseased and defective demand more than twice the volume of hospital and institutional care required of all other diseases combined. In 1934 all but 2 per cent of patients in hospitals for mental disease were in public institutions, approximately \$150,000,000 is expended annually for their care. Known methods are far from being fully utilized for the prevention, treatment and supervision of the mentally diseased and deficient.

These are but a few examples, briefly presented, of the public-health problems with which we are confronted, but perhaps they will suffice to show the need for doing something more than has been done. It is possible by applying the knowledge

of public health now available to cut down greatly the economic losses these and other diseases entail. The plan which the committee recommends is in substance as follows:

*A* The development of state and local health organizations to a degree that will enable them to apply more generally and effectively public-health measures for the prevention of disease and the promotion of health.

In view of the excellent beginning already made in carrying out health activities under the provisions of the Social Security Act, it is recommended that federal participation in state and local health services be extended through additional grants-in-aid to the states. Increasing federal participation and leadership should promote the inauguration and expansion of fundamental and accepted health services, and the extension of newly developed services under state and local operation and control. Special effort should be directed toward those diseases which are important causes of sickness and death and against which we already have effective measures of proved value: tuberculosis, venereal diseases, pneumonia, cancer, malaria, mental diseases and occupational diseases.

*B* The expansion of the work already carried on under the provisions of the Social Security Act for health services to mothers, children and crippled children.

It may be possible to save the lives of 70,000 mothers and babies each year if means are made available. There are 90,000 deaths a year of children under fifteen. Note that the work is done through the state and local health agencies of the several states in accordance with the laws of each.

#### MEDICAL CARE FOR THE MEDICALLY NEEDY

The need for medical care of persons on relief and in families with very low incomes is completely recognized by the medical profession, by public-health and welfare authorities and by others. While death rates are higher and sickness more frequent and severe among the poor than among families in comfortable circumstances, the poor receive less medical care than the well-to-do. There is not a state in the nation, and scarcely a county or city, that has not been confronted with this critical problem. Yet the present system of public medical care has failed to meet this situation.

It is estimated that 40,000,000 persons—almost one third of our population—are today in families with incomes of less than \$800. Half this group are dependent on public funds for food and shelter. The other half—the so-called self-supporting families—can provide a minimum of food, clothing and shelter for themselves, but can-

not meet their sickness costs. A family in this latter group may go along for months without applying for relief. Then the bread-winner becomes sick, and income, precarious as it is, stops. The family is on relief. Or again, a mother contributing to the support of the family may have to give up her job to care for a sick child or husband, and so the family goes on relief. A large proportion of such needy people live in small cities or rural areas in which there are few hospitals, doctors and nurses. This is a major obstacle to their efforts to obtain adequate medical care.

Local governments have proved unequal to the solution of such problems without assistance. It is the proposal of the committee, therefore, that state programs aided by the federal government be developed as the only adequate solution for the needs for medical care of this large group of the population. Public funds in addition to those now expended are necessary to pay for physicians' fees, drugs and appliances, hospitalization and nursing care and essential dentistry. The committee recommends that the programs be organized on a state and local basis, with the full cooperation of the medical profession and of public and private hospitals and clinics, health departments and welfare agencies. No uniform program is proposed to meet the varying needs of the states. Indeed, the proposal for medical care of the poor is founded on the belief that, given necessary financial and technical aid, every state will be able to work out a satisfactory way whereby its sick poor will receive an approved standard of medical care, the costs of which, including doctor's services, are paid from public funds.

#### EXPANSION OF HOSPITAL FACILITIES

The development of any program designed to provide medical services to meet the needs of large groups of people involves a consideration of existing hospital facilities. The second recommendation of the committee therefore relates to the expansion of hospital facilities. It embraces a plan for providing essential hospital beds and facilities with such geographic distribution that they will be within reasonable distance and at reasonable cost so that the great majority of our people who need them can use them. It is proposed to add 360,000 beds to the million now found in registered general hospitals, tuberculosis sanatoriums and mental institutions. In addition, the committee proposes the construction and equipment of at least 500 diagnostic centers in remote areas where it would be impracticable to construct hospitals. These could also serve as headquarters for local health departments, thus co-ordinating the health services of the community. Through these

centers, as well as through the proposed expansion of hospital facilities, physicians hitherto handicapped by lack of adequate diagnostic equipment and laboratory services would be able to render better service to their patients

It is not planned to build a new hospital in every county in the United States. The committee simply proposes to aid the states in increasing the number of free and low-cost beds in general hospitals in communities where they are needed, and to relieve the already overcrowded conditions in tax-supported institutions for the care of the tuberculous and the mentally ill. This may be done either by building new institutions or by adding to approved hospitals. In its program for the expansion of hospital facilities, the committee considers the country as a whole with its varying social, economic and geographic conditions. The estimate of 360,000 additional beds and 500 diagnostic centers, with temporary maintenance grants for the support of the new beds, represents a measure of need on a national basis which must be subdivided to ascertain local requirements.

#### GENERAL PROGRAM OF MEDICAL CARE

The fourth major problem to which the committee has given consideration relates to the financial burdens and the economic insecurity which sickness creates for self-supporting persons. I do not believe that anyone knows all the answers to the problems of general medical care, nor does the committee assume this position. Nevertheless, sufficient experience has been gained in other countries and in the operation of many plans now under way in different parts of the United States to warrant planning for a more even distribution of the costs of medical care in this group.

No one can say whether your family or mine will get through the next year without a catastrophic illness. Self-supporting families can ordinarily meet the costs of minor sickness, but often they are unable to cope with a prolonged, serious illness. For the vast majority of our people, such a catastrophe often spells an insupportable burden of debt, even of serious curtailment of income and of financial disaster. The committee recommends that federal aid be given the states so that they may develop plans for distributing this unpredictable and disastrous burden of illness in families in moderate circumstances. Two ways—or a combination of the two—are suggested. The first is to finance medical care for the entire population through a general tax. The second relates to self-supporting families only, and involves the application of the insurance principle. A scheme of compulsory health insurance, aided in part by the federal government, would require

contributions by the insured. Since it would be difficult if not impossible to apply the insurance principle to a numerous group of the population, namely agricultural workers, domestic labor and of course the unemployed, it might be necessary for some states to adopt a combination of these two methods.

It should be borne in mind that the committee at no point in this program suggests a national compulsory health-insurance plan or any mechanism for the rendering of medical care which would call for federal or state regimentation of medical practice. The road is left open to every state and every community to work out a satisfactory way by which medical care may be purchased without hardship. Federal participation would be confined to financial assistance and technical aid in developing the program.

#### INSURANCE AGAINST LOSS OF WAGES DURING SICKNESS

The fifth recommendation of the committee contemplates a plan of compensation for loss of wages because of sickness. The principle of this program is written into the law of virtually every state in the Union in workmen's compensation provisions. It is proposed that the federal government take the leadership in extending this principle to cover loss of wages resulting from general illness, as well as sickness resulting from employment. In view of the fact that not only the costs of medical care but the loss of income during disability is a principal factor in dependency—in good times and in bad—this proposal is both reasonable and sound.

#### COSTS OF THE PROPOSED PROGRAM

What will this vast program cost, and who will pay for it? It should be stated that the committee made no estimates for the costs of the last two recommendations, since these proposals deal primarily with suggestions for the redistribution of over-all expenditures now being made. The estimated costs of the first three proposals are governed by the principle of effective, comprehensive, long-range planning. A gradual development of the needed facilities and services over a ten-year period is contemplated. Effectively to establish adequate public-health service, maternal and child-welfare programs, medical care of the needy and expansion of hospital facilities, a maximum estimate of \$850,000,000 annually in funds from federal, state and local governments was made. Of this sum the federal government would pay on the average about 50 per cent.

Estimates for preliminary stages of the program were made for certain of the proposed activities, as

*Recommendation I-A* (public health) For the first year, \$20,000,000 from federal, state and local sources, with gradual increases to a possible maximum of \$200,000,000 by the beginning of the seventh year

*Recommendation I-B* (maternal and child health) For maternity and infancy, during the first year, \$9,000,000, with gradual increases to \$50,000,000 in the fifth year, and to the full amount, \$95,000,000, in not less than ten years. For medical care of children, during the first year, \$6,000,000, \$30,000,000 by the fifth year, and not less than \$60,000,000 by the tenth year, provided that Recommendations II and III are not in full operation at that time.

*Recommendation II* (hospital facilities) The total over all cost is estimated at \$1,104,500,000 for construction, plus \$177,000,000 in federal grants for temporary maintenance, or an average annual expenditure of about \$146,000,000 for ten years

*Recommendation III* (medical care for the medically needy) For the first year, \$50,000,000, by the fifth year, \$150,000,000, by the tenth year, \$400,000,000

Thus, in the first year it is estimated that approximately \$150,000,000 would suffice to launch sound, well-planned programs in these directions

Federal participation would amount to 50 per cent of the total expenditure, with the exception of temporary maintenance grants for hospital facilities which would be borne in whole by the federal government

\* \* \*

Our experience with the administration of the

public-health provisions of the Social Security Act has shown the effectiveness of federal and state co-operation in the development of sound programs of service and health conservation. Plans for the work to be accomplished are initiated in the state health departments. Administration and control of the activities carried on in the states remain in the hands of state and local authorities. The function of the federal government is to level the inequalities in financial resources in the states, and to provide the technical and consultant leadership essential in a well-co-ordinated national attack on preventable sickness and death

These principles are suitable for immediate application in a far-reaching and comprehensive program for the health protection and medical care of our people. Indeed, it is suggested that the administrative procedures worked out by the states with the federal government in the development of the health provisions of the social-security program be used as a guide for future expansion

The committee confidently expects from such a program a generous return on the investment. The question, from the business standpoint, is not, Can we afford a national health program of sufficient scope and extent to meet the needs, but rather, Can we afford not to do all that can be done to reduce needless sickness and death?

## THE CHANGING PRIVATE PRACTICE OF MEDICINE\*

ROGER I LEE, M.D.

BOSTON

IT is always a pleasure and privilege to listen to Warren Draper. He talks our language. It could hardly be otherwise since he received his formal education at Amherst and at the Harvard Medical School. But it is the man himself that catches our imagination and holds our admiration. To his formal education he brings humor, intelligence, sincerity and devotion. His experience, since his academic days, has been vast, and what he says is authoritative

We shall all agree, I think, that in the last few years there has been a tumult and a turmoil about what seems to be designated at this moment as "socialized medicine." It appears to be the same thing that was once called the "cost of medical care," then later the "costs of medical care," and that eventually turned out to be none of these or even the "costs of sickness," which it might be argued was what was really meant. At this phase

the doctors contributed a phrase "medical economics" which was the worst term yet in its implications and possible interpretations. Perhaps socialized medicine is a good term. I do not know. But I do know that sociology is to many people the study of socialism. At this moment, nearly everyone who has a pen or a voice has taken part in the excitement, and everyone has his theory. "State medicine," "compulsory health insurance," "adequate medical care for all," "medical care a right not a privilege" are phrases on the tip of everybody's tongue. Sociologists, reporters, economists, sob sisters, politicians, hospital superintendents, all want to reorganize the medical profession

But the medical profession is not having a private row of its own. There is the Alberta Plan, the Thirty-Dollars-Every-Thursday, alias the Ham and-Eggs, Plan, and countless others. Everyone has his plan. It reminds one of the hurricane. Everyone wanted to tell his hurricane experi-

\*An address delivered at the New England Postgraduate Assembly, Cambridge, November 15, 1938

ence We need a device like that of the sandwich man who on the bottom of his boards had printed 'I'll listen to your hurricane story for ten cents' I, for one, am prepared to believe that most of these plans are devised by honest, sincere people But experience leads to a certain cynicism For example, I recall that all the noted economists, with rare exceptions, if any, declared that the World War could only last two months or a few months at most I also recall that, with few or no exceptions, none of these economists predicted the so-called depression Yet it is a fact that the World War lasted over four years, and that there was a depression—somehow doctors survived both, which is more than can be said of many of our best businesses

At the National Health Conference held in Washington last summer, the comment of one man that "the plans were too simple to be reliable" merits careful consideration

I\* have elsewhere pointed out the obvious fact that rapid changes are taking place in medical practice Those changes are all in the direction of socialized medicine and state medicine I have watched in the hospital the birth and growth of social service I have watched the birth—in the same sense that Philadelphians always say that Benjamin Franklin was born in Philadelphia at the age of seventeen—of the United States Public Health Service and, again parenthetically, I am a member of its advisory council During long years of service on the Massachusetts Public Health Council, I have watched the growth of the state public-health activities At no time have I believed that close, friendly co-operation between medicine and public health is an impossibility But I have also watched the growth of the medical profession I point out now what is often forgotten, that the public-health movement was a legitimate and "planned" child of the medical profession and has always been fostered and nurtured by it And I also want to emphasize that the medical profession, essentially without assistance, corrected abuses and put education in medical schools on its present high plane True it is that certain governmental units, such as the Commonwealth of Massachusetts, have disgraceful licensing laws But that is a fault of the states, not of the profession Again, the extraordinarily favorable morbidity and mortality statistics in this country are due to the medical profession

Doubtless things have changed since the horse-and-buggy days, and even more since the doctor-saddlebag days, and yet more since the gold-headed-cane days Personally, I like to think of

the doctor using the gold head of the cane as something to put in his mouth because he knew so little in those days that any utterance of his might expose his ignorance But, there is ignorance in these days There were charlatans then as there are now Human nature has not changed (Indeed, it might be argued from some of the events in this troubled world that human nature is worse)

As I see it, the problems of medical practice are essentially only two that of the distribution of medical services and that of continuing the education of the practicing physician

So far, the bulk of the emphasis has been laid on distribution Formerly, the doctor took rich and poor in his stride One of the most successful general practitioners has told me that he never charged a servant, a minister, a doctor or a nurse And there were many others that he did not charge It is to the credit of the medical profession that the impetus to make professional charges for care of the indigent did not come from its ranks Yet it is an old custom The young doctor was the city or town physician or was paid a small sum yearly for work in the districts of the Boston Dispensary He did that to keep his hand in, if you will, but also to help out his budget,—accursed word of modern times,—just as he examined for insurance companies, and the like Nowadays there seems to be an agreement that the doctor should not carry, with out help or without some plan, the whole or nearly the whole of practice among the indigent And within the hospitals, the administrators see possibilities of balancing their budgets from reimbursements for the care of indigent patients

Your doctor of today must give much of his time and energy to keeping himself abreast of that swiftly running stream of medical progress The same friend to whom I referred earlier did his own social-service work, and he did it marvelously well But that too is largely given up by the practicing doctors This is an age of specialism Even if we grant, and I think we must, that specialism has gone too far, we must acknowledge that the public likes the idea of specialists (except the idea of paying for them) and that specialism has become a sort of legitimate showmanship that somehow gets by the committees on ethics and discipline Regardless of this, the practitioner who keeps himself in touch with medical advances is going to be a better, a more skilful doctor In most cases he is not going to be the family friend, except on the golf links or at the bridge table To be sure, this is a conservative view because many of our planners would have him a servant of the government And this, I fear, would result in many doctors becoming a

part of a great bureaucracy. But much more dismal than that picture is one of two great groups of practicing doctors, side by side and in competition. On the one hand, one might envisage the government, let us say the United States Public Health Service, developing and extending its practice of medicine. Of course, the beginnings would be small—the indigent, supposedly far-off areas, rural hospitals, and so forth. Is it likely or reasonable to suppose that these several hundred diagnostic clinics will be exclusively diagnostic? Who can differentiate precisely where diagnosis leaves off and treatment begins? Then let us remember the story of the camel and the tent. In my opinion such a situation would be indeed a calamity, but it is by no means fantastic.

I believe that if the doctors and the medical profession continue their consecration to the ideals and traditions which have brought forth such an abundant harvest in relation to the welfare of all the people, such changes as are necessary will be adopted now and in the future just as they have been in the past. Your 1938-model doctor hardly resembles his father, but medicine is still a glorious profession. It is not a trade, nor a political football and, please God, it will never be.

And in the end we will look on the glorious achievements of the past and present and say with justifiable pride, I shared, perhaps humbly, in some of these achievements. We have been through a war and through a depression, but we still have our profession.

264 Beacon Street.

## THE CHEMISTRY OF THE ANAEROBIC RECOVERY OF MUSCLE\*

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IN THE course of the last fifteen years a great deal has been accomplished in the elucidation of the chemistry and thermodynamics of the processes which underlie muscular activity. Although the final goal, the understanding of the physical mechanisms of contraction and the interrelations of the various chemical processes, is as yet remote, the significance of the endothermic and exothermic reactions is gradually becoming clear.

In this report I shall discuss that portion of the process which is concerned with the events of the anaerobic-recovery phase of muscular contraction. Up to 1926, as is known, a study of muscle under anaerobic conditions revealed only the relation between muscular activity and the formation of lactic acid. Subsequently, two more chemical reactions were recognized which had both causal and temporal relations to the performance of work. One was the discovery that the "phosphagen" (Eggleton and Eggleton<sup>3</sup>) in muscle was creatinephosphate (Fiske and Subbarow<sup>5</sup>), which was capable both of decomposition into creatine and phosphate and of resynthesis into the original compound. The other was the discovery in 1929 of adenylypyrophosphate (adenosinetriphosphate), which can hydrolyze into adenylic acid (adenosinemonophosphate) and phosphate (Lohmann<sup>13, 15</sup> and Fiske and Subbarow<sup>6</sup>). These split products can then be resyn-

thesized, with the intermediary formation of adenosinediphosphate, into the original compound.

This hydrolysis of and esterification to adenosinetriphosphate constitutes a necessary step in the reaction that Embden had interpreted as the breakdown and synthesis of "lactacidogen" (the preformed hexosephosphate of muscle). Finally Lundsgaard,<sup>16-18</sup> in 1930, discovered that a muscle poisoned with iodoacetic acid could contract anaerobically for some time, entirely without the formation of lactic acid. Such important discoveries rendered the former concepts so inadequate that my friend A. V. Hill<sup>9</sup> in 1932 gave a series of lectures in America under the title "The Revolution in Muscle Physiology."

Such revolutionary periods are always fertile epochs. Although in the beginning some confusion of opinion may arise, and some doubting scientists may be ready to distrust and discard all the data, there gradually emerges a more clearly defined concept. This is especially true when the previous data are found to reinforce the new and permit the integration of the whole. The accumulation of new facts warrants such a formulation at present with regard to the processes of the anaerobic recovery of muscle.

The suspicion of contemporary scientists concerning the validity of our picture is based on two objections. (1) Do the chemical analyses of dead muscle, in which splitting and synthesis of the chemical compounds had been found, give a reliable picture of the events *in vivo*? Are they not

\*A lecture delivered before the Alpha Omega Society, Harvard Medical School, October 29, 1937.

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artefacts, postmortem changes, whose relation to vital processes is unknown? (2) When three different and apparently unconnected processes are already known to accompany muscle activity, have we not to assume many others, and might it not be that none of the processes known so far are of especial importance in muscular work?

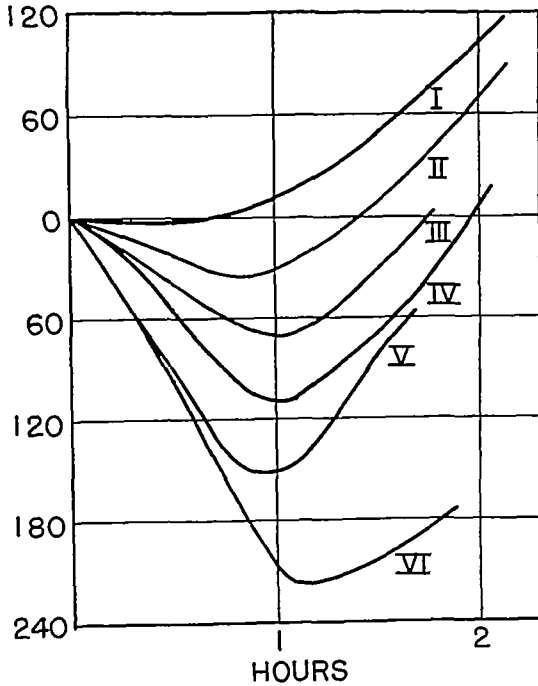


Figure 1 *Hydrogen Ion Concentration Changes in Muscle during Fatigue as Measured by Carbon-Dioxide Exchange*

*Carbon-dioxide output—indicating increased acid ity—is measured on the ordinates from zero upward carbon-dioxide uptake—indicating increased alkalinity—is measured on the ordinates from zero downward*

Curve I	1.1 vol per cent	(pH 7.93)
" II	5.0 " " "	( " 7.23)
" III	7.9 " " "	( " 6.97)
" IV	16.2 " " "	( " 6.75)
" V	34.5 " " "	( " 6.45)
" VI	71.5 " " "	( " 6.07)

I believe that both objections can be confidently refuted. In respect to the first, it was learned some years ago that the syntheses and decompositions in question were accompanied by changes which could be demonstrated in the living muscle by physicochemical measurements. For example, the alterations connected with the decomposition of creatinephosphate are always contrary to those connected with the breakdown of carbohydrate to lactic acid. Thus Lipmann and P<sup>12</sup> in 1930 found a shift of pH to the alkaline side with the enzymatic splitting of creatinephosphate, and to the acid side with the formation of lactic acid. On

account of the difference between the second dissociation constant of phosphoric acid and that of creatinephosphoric acid, the alkalization connected with this breakdown became the greater the more the initial pH was brought to the acid side by the addition of carbon dioxide. Chemical analysis showed that, on anaerobic stimulation of a normal muscle, at first much creatinephosphate was broken down compared to the amount of lactic acid formed, with increasing fatigue this proportion was shifted so that an increase in the formation of lactic acid resulted. Moreover, the amount of creatinephosphate present was the resultant of the simultaneous breaking down and resynthesis, and hence the amount of the creatinephosphate split was less during recovery than at the height of tetanus. The conclusion is that during a contraction the rate of breakdown corresponds to the development of tension, but that

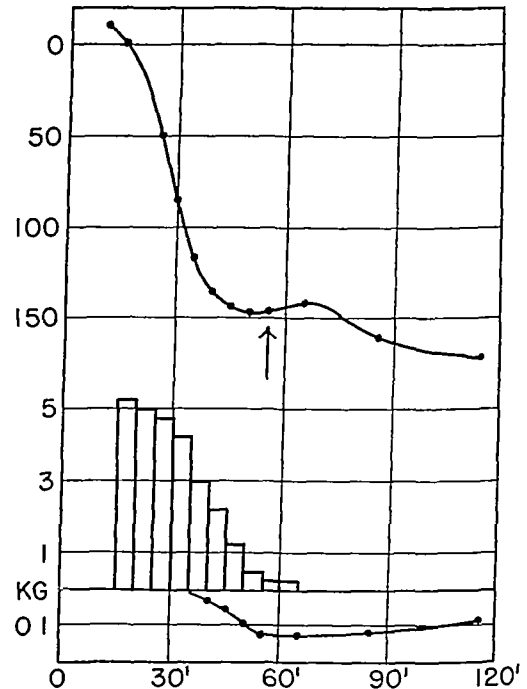


Figure 2 *Changes Accompanying Fatigue in a Muscle Poisoned with Iodoacetic Acid*

*The upper curve represents the carbon-dioxide uptake (cu mm per gram of muscle) in an atmosphere containing 33 vol per cent carbon dioxide. The rectangles represent the sum of tension of twitches per gram of muscle during 5 minute intervals. The lower curve represents the tension of rigor per gram of muscle.*

the resynthesis is incomplete with the first contractions, while in the latter ones the resynthesis is more and more complete, so that in the steady state no further breakdown can be observed.

The change in pH of the living muscle during

fatigue corresponds exactly to that predicted by chemical analysis. In a series of contractions, the muscle becomes at first more alkaline and later more acid, and the alkalinity is the more pronounced the higher the concentration of carbon dioxide (Fig 1). In muscle poisoned by iodoacetic acid (Fig 2) the alkalinity increases with fatigue. Chemical analysis proves that the hydrolysis, which is the equilibrium between breakdown and resynthesis, is as large as in normal muscle. However, at the height of tetanus and subsequently there is no resynthesis of creatinephos-

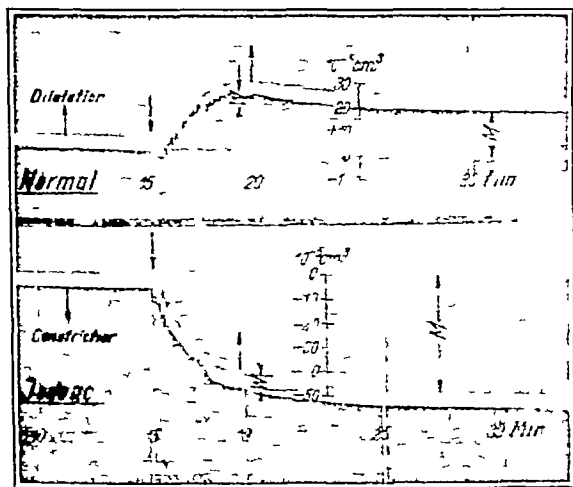


Figure 3 Volume Change in a Series of Tetanic Contractions of 2 Seconds' Duration

The upper curve represents normal muscle undergoing fatigue and the lower iodoacetic-acid poisoned muscle. The distances between the two arrows on each curve designated W give the corrections for the heat of contraction. The distances between the two arrows designated M give the total volume changes per gram of muscle after complete fatigue.

phate or formation of lactic acid. Recently Dubousson<sup>2</sup> measured this pH shift with a glass electrode and thus obtained still more exact results. When the pH is calculated from chemical data in the poisoned muscle, the agreement between

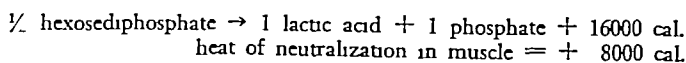
taneously in muscle. As I found with Möhle<sup>22</sup> the molecular volume rises when glycogen is split to lactic acid, it decreases with the splitting of creatinephosphate and also of adenosinetriphosphate. Besides the rapid volume change, discovered by the Hungarian investigators Ernst and Üj,<sup>4</sup> a more protracted one can be observed, which is co-ordinated with chemical reactions. I disregard here the course of the details of the change in volume during single tetanic contractions, and give only two curves which show the total effect. Normal muscle undergoing fatigue (Fig 3) shows at the onset a diminution in volume which accompanies the initial breakdown of creatinephosphate. This decrease is followed by an increase in volume which parallels the excess formation of lactic acid. In muscle poisoned by iodoacetic acid, the diminution in volume is present from the onset, and the shrinking continues until the development of rigor (Meyerhof and Möhle<sup>22</sup>). In regard to volume changes also, the muscle treated with iodoacetic acid shows agreement between calculated and determined values to be almost exact, yet in the normal muscle the effect of lactic acid is smaller than the calculated value, but qualitatively in substantial agreement with the theory.

A study of the changes in transparency of muscle has been made at our institute by Muralt.<sup>24</sup> It will suffice to state that he found that these changes in the muscle corresponded to those predicted from the observed chemical reactions.

We may conclude without reservation that the splittings and resyntheses revealed by chemical analysis really take place during muscular activity.

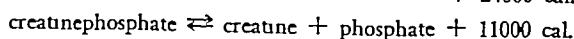
Experiments on living muscle have demonstrated that a breakdown of creatinephosphate precedes the formation of lactic acid. Therefore the energy of the latter is available for the endothermic resynthesis of creatinephosphate. Thermodynamic calculations on normal muscle and that treated with iodoacetic acid correspond with this conception. The more exact elucidation of this relation was due to experiments on the ex-

A



+ 24000 cal.

B



prediction and measurement is almost exact. In the normal muscle the formation of lactic acid is smaller than that calculated from the change in pH, but is still in essential agreement with that predicted.

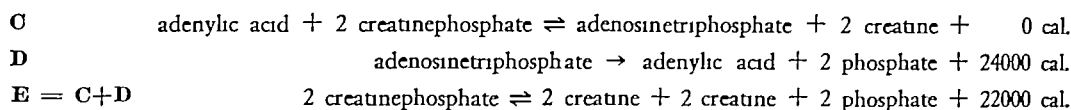
Other physicochemical measurements also indicate that antagonistic effects are produced simul-

tracts of muscle containing the enzymes. Although such an experiment bears no relation to the events taking place in muscular activity, the chemical reactions can be studied with excellent results. The transformations in energy of these reactions, which are catalyzed by enzymes, calculated per mol, are shown in Reactions A and B.



The values given are those for total energy, which do not coincide with the free energies but do correspond to the myothermic measurements. The heat of splitting of hexosediphosphate into lactic acid and phosphate amounts to 16,000 calories per mol of lactic acid, but in muscle this heat is increased by the neutralization of lactic acid to about 24,000 calories. On the other hand, the

Later Lohmann<sup>14</sup> demonstrated that the reverse reaction, namely the splitting of creatinephosphate, caused the synthesis of adenosinetriphosphate. It was therefore obvious that a reversible reaction takes place, as illustrated in Figure 4. The existence of this reaction was proved by Lehmann<sup>11</sup> at our institute. The pH has a great influence on this equilibrium, the amount of



splitting of one mol of creatinephosphate yields 11,000 calories. Very careful experiments by Lundsgaard<sup>18</sup> have shown that during the anaerobic restitution two mols of creatinephosphate are resynthesized for each mol of lactic acid formed after contraction. Thus + 24,000 calories for one mol of lactic acid formed is opposed to -22,000 calories for two mols of creatinephosphate resynthesized, so that a slight evolution of heat results.

The well-known measurements of Hartree<sup>8</sup> and Hill<sup>9</sup> have proved that a very small amount of delayed heat is liberated during anaerobic restitution, averaging 5 per cent of the initial heat. The amount is less when the muscle is in good condition. Moreover, under special conditions a transitory endothermic phase has been observed at the beginning of the anaerobic restitution. This phenomenon will be referred to later. Lohmann

creatinephosphate increases with the alkali.

This reaction is summarized in Reactions C, D and E. Thus 24,000 calories from splitting adenosinetriphosphate is to be compared with 22,000 calories from the splitting of two mols of creatinephosphate, so that the actual heat of the reversible Reaction C is almost zero. If, now, creatinephosphate is to be split into creatine and phosphate, Reaction C has to go to the right, the adenosinetriphosphate has then to be converted into adenylic acid and two mols of phosphate by the action of phosphatases ( $E = C + D$ ). The removal of adenosinetriphosphate (Reaction D) causes Reaction C to go from left to right, and results in a splitting of creatinephosphate. The removal of adenylic acid causes the reaction to go from right to left, and synthesizes creatinephosphate.

This intermediary action of adenylic acid is brought about by the formation of lactic acid in two different ways, with a resultant shift in the equilibrium toward the synthesis of creatinephosphate. To explain this more fully I must briefly describe the sequence of intermediary products of the breakdown of carbohydrate, which in the formation of lactic acid and in alcoholic fermentation are almost identical. The steps involved are indicated diagrammatically in the accompanying scheme. The detailed proof of their validity (Meyerhof, Kiessling, and Schulz<sup>20</sup>) is omitted.

Pyruvic acid may be the starting-point for the formation of either alcohol or lactic acid. In the latter case we have the reduction of pyruvic acid into lactic acid. In the stationary state this reduction reaction is equivalent to the oxidation of triosephosphoric acid into phosphoglyceric acid. The reversible reactions designated by double arrows progress without coenzymes, whereas phosphorylation and hydrogen transfer require coenzymes. The coenzyme for phosphorylation is the adenylic system, that for hydrogen transfer is the cozymase discovered by Harden, studied by Euler and chemically determined by Warburg.\*

References to this subject may be found in the article by D. Needham in the *Annual Review of Biochemistry*, 1937.

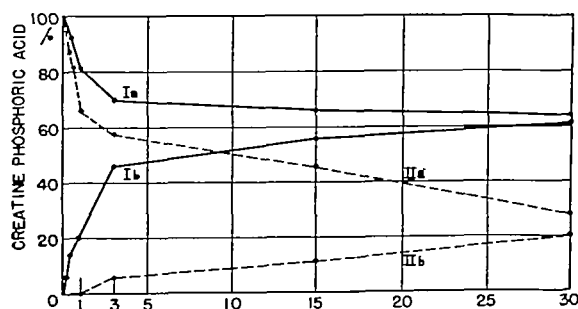
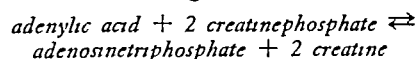


Figure 4



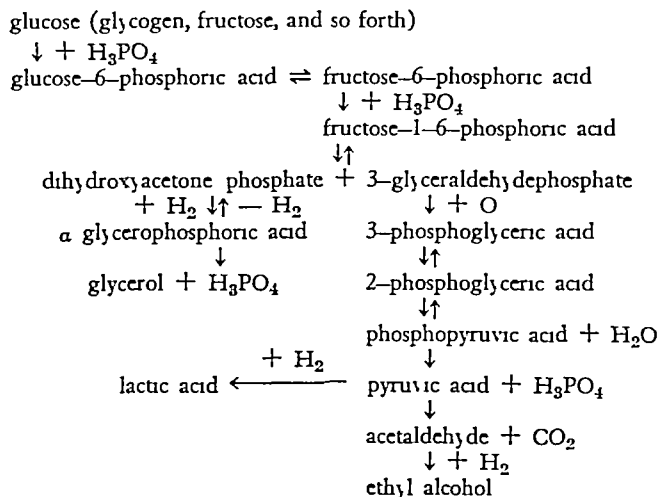
Curve Ia starts from the left side of the equation  
Curve Ib from the right. Curves IIa and IIb show  
the same reaction with excess of creatine

and I found ten years ago that, in an extract of muscle also, creatinephosphate is resynthesized from its split products during the formation of lactic acid. Some years later we<sup>21</sup> observed that the addition of adenosinetriphosphate to a muscle extract caused synthesis of creatinephosphate.

In 1934 Parnas and his associates<sup>25</sup> discovered that phosphopyruvic acid, in both muscle tissue and extracts, on splitting does not set free in-

ceeded in solving this puzzle. Because the splitting of phosphopyruvic acid is the only source of phosphate in these reactions, the synthesis of the

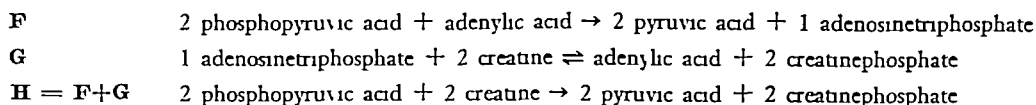
#### BREAKDOWN OF CARBOHYDRATE



organic phosphate, but transfers it to creatine to form creatinephosphate. This is represented in Reactions *F*, *G* and *H*. The adenylic system,

second mol of creatinephosphate cannot be derived from this source. It will now be shown how the second mol of creatinephosphate is

#### PARNAS REACTION

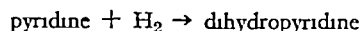


which acts as a catalyzer, does not figure in the end result ( $H = F + G$ ). The splitting of phosphopyruvic acid is an intermediary reaction of the formation of lactic acid also, for one mol of lactic acid and one mol of phosphocreatine are produced for each mol of phosphopyruvic acid hydrolyzed.

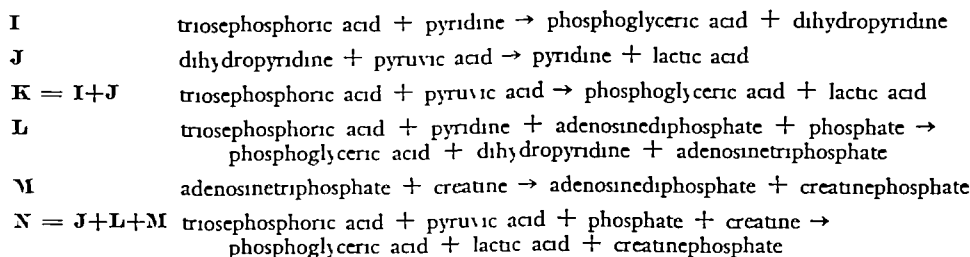
The analysis is, however, not yet complete, for as previously stated, two mols of creatinephosphate are synthesized by muscle for each mol of

brought about by hydrogen transfer.

Exactly as the adenylic system acts as a catalyzer of phosphate transfer, so cozymase interacts as a catalyzer of hydrogen transfer. According to Warburg and Christian,<sup>27</sup> cozymase is a pyridine-nucleotide which takes up hydrogen according to the equation



Experiments at our institute (Meyerhof<sup>19</sup>) show



lactic acid (see Reactions *A* and *B*). But the Parnas reaction yields only one mol. How does the synthesis of the second mol of creatinephosphate come about? Only recently have we suc-

ceeded in solving this puzzle. Because the splitting of phosphopyruvic acid is the only source of phosphate in these reactions, the synthesis of the

action *K* However, if inorganic phosphate and adenylic acid or adenosinediphosphate are present, the reaction goes rapidly Under these conditions the approximate Equation *L* is valid This is followed by the rapid reaction represented by Equation *J* The adenosinetriphosphate formed according to Equation *L* is reconverted into adenosinediphosphate according to Reaction *M* At the same time the creatine is phosphorylated, thus providing for the formation of the second mol of creatinephosphate The end result of the reaction is given in Equation *N*

The adenylic and the pyridine systems serve only as catalyzers and do not appear altered in the final reaction Rapid oxidation and reduction take place between triosephosphoric acid and

Table 1 Total Balance

1 hexosediphosphate + 4 creatine + 2 phosphate →  
2 lactic acid + 4 creatinephosphate  
32000 cal — 44000 cal = —12000 cal

COMPONENTS	1 Cc. MUSCLE EXT CONTAINS	RATIO	FOUND	CAL CU LATED
	× 10 <sup>-6</sup> mol			
A Hexosediphosphate	—15.5			
B Inorganic phosphate	—28	B/A	1.75	2
C Creatinephosphate	+60	C/A	3.90	4
D Lactic acid	+24	D/A	1.55	2

pyruvic acid For each mol of lactic acid formed one mol of creatinephosphate is synthesized from creatine and inorganic phosphate The energy from the oxidation-reduction reaction is utilized for the synthesis of creatinephosphate

The energy balance for all these reactions has not only been calculated but has also been measured calorimetrically The heat evolved from the splitting of sugar to lactic acid, without counting the heat of neutralization, is + 16,000 calories per mol The heat of splitting phosphopyruvic acid into pyruvic and phosphoric acid is + 8000 calories In the Parnas reaction this + 8000 calories is to be balanced against — 11,000 calories from the synthesis of one mol of creatinephosphate, so that the complete reaction has a negative heat of 3000 calories Therefore of the total heat incident to the formation of lactic acid, + 16,000 calories, half is accounted for by the splitting of phosphopyruvic acid There remains only half the total heat for the sum of all the other reactions which result in one mol of lactic acid This heat is the result of different components with opposite signs When we disregard the sources, 8000 calories is available for the synthesis of the second mol of creatinephosphate, although 11,000 are required

The total changes may then be summarized as follows When we convert hexosediphosphate, in a suitable enzyme extract, in the presence of cre-

atine and phosphate, taking into account the Parnas reaction and that described above, we can calculate and measure the total energy transfers, as shown in Table 1 Four mols of creatinephosphate are synthesized from one mol of hexosediphosphate and two mols of inorganic phosphate In Table 1 are given the actual figures of an experiment in which the energy transfer is calculated in terms of 10<sup>-6</sup> mol per cubic centimeter of muscle extract For example, 60 × 10<sup>-6</sup> mol of creatinephosphate is synthesized from 15.5 × 10<sup>-6</sup> mol of hexosediphosphate The ratio found is 3.9 in stead of the calculated ratio 4.0 (Meyerhof, Schulz, and Schuster<sup>23</sup>) The formation of two mols of lactic acid is strongly endothermic (—12,000 calories)

As an example of the rates involved in this reaction, two calorimetric measurements are given in Figure 5 In the one case neutralization was

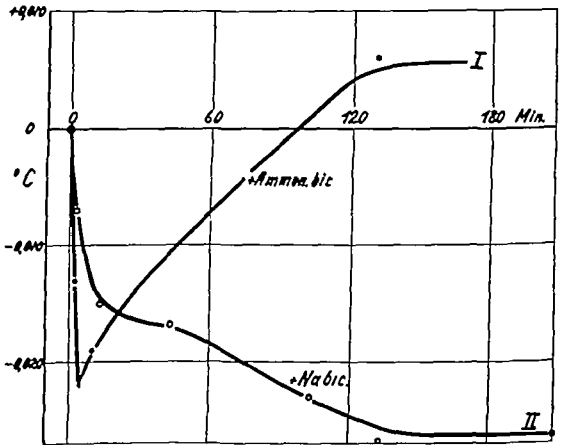


Figure 5 Course of the Heat of Reaction (Meyerhof<sup>19</sup>)

Curve I in presence of ammonium bicarbonate shows great heat of neutralization, Curve II in presence of sodium bicarbonate shows small heat of neutralization

effected by sodium bicarbonate and in the other by ammonium bicarbonate With the former the total reaction is endothermic because the heat of neutralization is small The temperature falls rapidly at first, and then more slowly Neutralization with the latter gives values similar to that of protein The initial negative heat phase is followed by a positive heat neutralization and the total is slightly positive This curve resembles that for the heat of the anaerobic restitution of muscle as found by Hartree<sup>8</sup> when working under especially suitable conditions I think that these calorimetric measurements in enzyme extracts render a most perfect analogy to the rate of heat production in the anaerobic restitution of living muscle

These peculiar reactions are of great significance in the metabolism of living muscle The presence

of free creatine and free phosphate during the formation of lactic acid by the muscle enzymes is important not only for the thermodynamics of the reaction but also for its velocity. As is well known, hexosediphosphate is decomposed slowly, a phenomenon which has prevented many investigators from considering this compound as a precursor of lactic acid or alcohol. In fact the triosephosphate originating from hexosediphosphate reacts very slowly in an enzymatic system with cozymase. However, this reaction becomes rapid as soon as inorganic phosphate, as an acceptor, and a little adenylic compound, as catalyzer, are present. In alcoholic fermentation the phosphate acceptor is glucose, but in muscle it is the very creatine which immensely accelerates the reaction. This sequence is graphically presented in Figure 6.

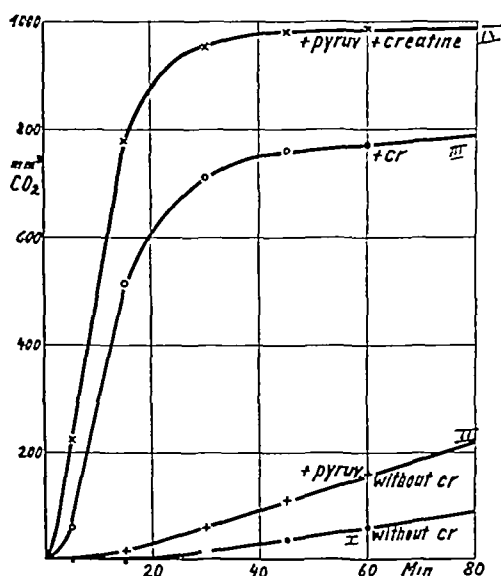


Figure 6 Creatine Effects

Effect of creatine on the velocity of the breakdown of hexosediphosphate (Curves I and III) and of the reaction between pyruvic acid and triosephosphate (Curves II and IV)

for an enzyme extract with and without creatine, for the total breakdown of hexosediphosphate, and also for the reaction between pyruvic acid and triosephosphate. The increase in the velocity of the breakdown of hexosediphosphate by the coupling with the synthesis of creatinephosphate is of extreme significance in the kinetics of this reaction in muscle. In fresh muscle, only hexosemonophosphate is present in large quantities. It can be shown by special experiments that hexosemonophosphate reacts only after it has taken up one mol of phosphate and become hexosediphosphate, which is the general intermediary in the formation of lactic acid. So long as the muscle is resting, creatine is present as creatinephosphate

and the lactic acid formation is minimal. But when muscle contracts, creatinephosphate is split into creatine and phosphate, and lactic acid is rapidly formed and released, as can be seen during the restitution period of muscle. This lactic acid induces the resynthesis of creatinephosphate as described above, and with the return to the original state, the formation of lactic acid ceases. By this means the total energy of carbohydrate breakdown is transferred to the resynthesis of creatinephosphate.

In muscle poisoned by iodoacetic acid the reactions can be similarly interpreted in so far as this coupling is concerned. Iodoacetic acid inhibits oxidation and reduction, and hence the triosephosphoric acid does not undergo any further reaction. Since there is no lactic acid, creatinephosphate which has been split cannot be resynthesized, because both kinds of phosphate transfer are lacking, namely the formation of phosphoglyceric acid and the splitting of phosphopyruvic acid. Anaerobically the free creatine remains unchanged. The free phosphate esterifies more glycogen, with the formation of hexosemonophosphate and hexosediphosphate. Apparently, as the experiments of Cori and his co-workers<sup>1</sup> and Parnas and Baranowski<sup>28</sup> have shown, this esterification of glycogen, as opposed to that of hexose, proceeds even without an oxidation-reduction reaction. Thus, when creatine is not available as a phosphate acceptor, the hexosemonophosphate and hexosediphosphate become the main products. The adenosinetriphosphate is preserved in the poisoned muscle so long as creatinephosphate remains. It breaks down only afterward, because the synthesis of adenosinetriphosphate is effected by the reaction of Lohmann<sup>14</sup> (see Reaction D), and ceases when this breakdown comes to an end.

The processes of the anaerobic restitution of muscle discussed here form only a small part of the chemical description of muscle activity. Many questions are as yet unanswered. Even the reactions here described require further elucidation. Especially requiring further study is the problem of why the simultaneous uptake of inorganic phosphate by the adenylic system accelerates the reduction of cozymase. In any event, it must be acknowledged that our understanding of the chemistry of muscle is considerably advanced over that of ten years ago. The older conception of the energy relations between the formation of lactic acid and the resynthesis of phosphagen can now be replaced by definite interdependent chemical reactions. By the elucidation of these reactions science has succeeded in at least partially unveiling one of life's fundamental processes.

Reprints of this article can be obtained from the Chemical Laboratory, Children's Hospital, Boston.

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## THE VITAMIN C STATUS OF DIABETIC PATIENTS\*

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THE physiological significance of vitamin C has become increasingly recognized since its identification as ascorbic acid<sup>1 2 3 4</sup> and the adaptation of simple methods for its determination. Recently several investigators have reported an effect of vitamin C on diabetes and carbohydrate metabolism. Roller<sup>5</sup> in 1936 reported that the administration of vitamin C caused a diminution of the glycosuria in diabetic patients. He also observed a lessened rise in blood sugar during food-tolerance tests if 1000 to 3000 mg of ascorbic acid was given with the food. In the same year Stoicesco and Gingold<sup>6</sup> reported in normal individuals a fall in blood sugar following the intravenous injection of 240 mg or the oral administration of 500 mg of vitamin C. In diabetic patients the results obtained were variable. Similarly Stepp, Schroeder and Altenburger<sup>7</sup> reported a lowering of blood sugar in normal individuals following a single intravenous injection of ascorbic acid but no effect from oral administration. These authors also observed in normal individuals, but not in those with diabetes, an increased hypoglycemic action of insulin following the simultaneous injection of vitamin C and insulin. Pfleger and Scholl,<sup>8</sup> under different conditions of vitamin

C saturation, confirmed in part the latter observation and in addition reported marked deficiency of vitamin C in the cases of diabetes studied. Schroeder<sup>9</sup> supported the idea of a deficiency of vitamin C in diabetic patients with evidence that retention after the intravenous injection of 150 mg or the daily oral administration of 300 mg of ascorbic acid may be as great as 97 per cent. Aszodi and Mosonyi<sup>10</sup> claim that vitamin C, especially if combined with vitamin B<sub>1</sub>, may be used in mild cases of diabetes to supplant insulin. Their study is particularly interesting as it is based on the assumption that, since vagotonic effects are known to follow injections of vitamin C, there might well be a stimulation of the pancreas through the vagus, causing an increased insulin secretion. As evidence they show the lowering of the blood sugar of mice following an injection of either human or dog serum taken from a subject previously injected with vitamin C.

In contrast to the above evidence suggesting a more or less specific bearing of vitamin C on glucose tolerance, sensitivity to insulin and carbohydrate metabolism in general, are the completely negative findings of Kreitmair<sup>11</sup> and Armentano and his co-workers<sup>12</sup>. These authors deny any specific relation of vitamin C to diabetes.

The present paper deals with the vitamin C status of a representative group of diabetic patients under observation in the George F Baker Clinic. The study is based on determinations of

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vitamin C in fasting blood plasma in conjunction with the saturation test proposed by Wright<sup>13</sup> We hoped thereby to evaluate the adequacy of the average diet in use here, and to detect any significant deviation from the normal in the response

were without fever or obvious signs of infection These patients are referred to below as surgical cases

The vitamin C content of the patients' diets prior to hospital admission was estimated by ques-

Table 1 Vitamin C Values in Diabetic Patients

No	CASE No	AGE	SEX	DIABETIC CONDITION				VITAMIN C		DAYS		DATA ON SURGICAL CASES	
				DURA TION OF DIA BETES	DAILY INSULIN DOSE	FASTING BLOOD SUGAR	FAST ING PLASMA CON TENT	5 HR URINE EXCRE TION	HOS PITAL BEFORE TEST	DAYS IN OP ERA TION	SURGICAL LESION	OPERATION	
		yr		yr	units	mg %	mg %	mg					
1	3649	56.3	F	15.3	16	0.16	0.33	65	13	10	3rd and 5th hammer toes right foot.	Amputation 3rd and 5th toes right foot	
2	16878	70.1	M	0.4	4 + 24	0.13	0.42	322	11	8	Gangrene left foot.	Left thigh amputation	
3	16887	61.8	M	0.9	10 + 24	0.08	0.47	362	4				
4	16926	62.5	M	14.9	10 + 20	0.10	0.52	401	6				
5	15261	63.8	M	13.4	16	0.09	0.53	446	2				
6	16266	68.3	F	12.9	16 + 10	0.16	0.56	404	13	12	Gangrene, right foot	Right thigh amputation	
7	16765	38.6	F	0.9	24 + 36	0.23	0.56	458	4				
8	16901	61.6	M	27.9	12	0.14	0.66	386	2				
9	13022	68.6	F	4.3	14	0.21	0.66	397	4		Ulceration right 3rd toe	None	
10	1877	55.6	M	18.4	10 + 28	0.11	0.66	406	13	11	Necrosis left great toe	Left thigh amputation	
11	15294	64.7	M	2.8	—	0.09	0.70	470	65	54	Carbuncle left buttock	Incision and drainage left buttock	
12	16763	68.2	F	0.2	16 + 16	0.27	0.70	533	1				
13	12423	71.1	F	6.0	4 + 36	0.18	0.71	374	19		Infection right great toe	None	
											tion left great toe.		
14	16986	68.8	M	>0.1	6 + 30	0.20	0.85†	—	20	12	Ulceration right leg heel and great toe.	Right thigh amputation	
15	16858	68.8	F	6.9	20	0.16	0.85	283	39	36	Gangrene, right great toe	Right thigh amputation	
16	16868	21.8	F	5.5	10 + 48	0.07	0.85	305	5				
17	13612	46.8	M	21.3	16	0.06	0.85	618	2				
18	14021	63 +	F	2.8	12	0.15	0.90	407	10		Necrosis 4th toe, left foot.	None	
19	16929	65.3	F	1.9	12	0.13	0.94	406	4				
20	16724	50.1	F	1.2	10 + 40	0.20	0.94	531	1				
21	16864	66.2	F	1.3	6 + 32	0.16	0.94	592	8	5	Varicose veins right leg	Ligation right saphenous vein	
22	16712	60	F	8.3	16	0.08	0.94	750	4				
23	16897	68.2	M	0.1	24	0.13	0.99	288	12		Ulcer left great toe.	None	
24	6281	39.7	M	11.8	4 + 26	0.16	0.99	553	3				
25	16576	52.2	F	13.4	6 + 40	0.09	1.03	244	20		Infected corn right great toe.	None	
26	13821	39.9	F	15.0	14 + 20	0.09	1.03	504	1				
27	10973	57.8	F	12.8	20	0.20	1.03	559	11		Infected callus right foot.	None	
28	4295	60.7	F	23.8	6 + 28	0.07	1.03	580	5				
29	10356	41.4	M	6.9	24 + 40	0.09	1.03	622	5		Ulcer left leg abscess right jaw	None	
30	16723	51.6	F	0.8	16	0.20	1.12	543	1				
31	16841	32.9	F	3.9	4 + 32	0.06	1.13	627	6				
32	13809	56.6	F	3.6	10 + 28	0.16	1.13	720	4				
33	16780	40.9	F	5.5	4 + 32	0.07	1.13	759	6				
34	10523	44.9	F	6.6	10 + 48	0.09	1.17	470	14				
35	16697	65.2	F	2.1	16	0.08	1.22	316	4				
36	4098	61.6	F	13.4	10 + 24	0.21	1.22	370	41	31	Abscess right buttock	Incision and drainage, right buttock.	
37	16779	48.4	F	0.5	20	0.08	1.27	521	4				
38	16197	20.0	M	0.7	8 + 28	0.14	1.31	765	5				
39	16906	36.1	M	0.1	20	0.10	1.32	670	4				
40	16721	67.2	M	5.8	22	0.14	1.36	481	4				
41	16722	51.9	F	>0.1	20	0.13	1.36	647	3				
42	16729	58.1	M	0.4	32	0.08	1.39	571	8				
43	16341	65.6	F	17.9	34	0.19	1.41	271†	5		Ulceration great left toe	None	
44	8908	61.3	F	11.9	8 + 36	0.22	1.46	506	17		Ulcer left foot.	None	
45	4956	67.2	F	18.2	16	0.16	1.48	556	3				
46	12892	65.8	F	9.0	0	0.11	1.50	688	27	12	Gangrene, 3rd and 4th toes, left foot	Left thigh amputation	
47	1916	70 +	F	24.0	4 + 22	0.14	1.64	538	7		Necrosis left heel and left great toe.	None	
48	5031	64.7	F	13.0	16	0.19	1.69	262	3				
49	15881	16.6	M	0.9	24 + 36	0.27	1.88	753	2				

Bold face figures represent protamine zinc insulin

†A second determination made 12 days later gave a fasting plasma value of 1.13 mg per cent

‡Collection incomplete.

of diabetic patients to the intravenous injection of a single large dose of ascorbic acid (1000 mg)

#### SELECTION OF PATIENTS

Seventy-seven adult patients with proved diabetes were selected as subjects. There were 31 men and 46 women. The ages varied from fifteen to seventy-six, most patients being over fifty. In so far as possible, patients with diabetes under good control were chosen. The length of stay in the hospital prior to the test varied from one to one hundred and twenty days, in most cases three to eight days. Some patients were included who, although suffering from lesions of the extremities, or convalescing from operations for them,

tioning, and in most cases it seemed reasonably adequate. This might be expected because in 36 of the 49 cases listed in Table 1 the duration of diabetes was of more than one year and in 33 of more than two years, and during this time almost all the patients had been following, more or less faithfully, diets which included vegetables and fruit in adequate amounts. The hospital diet averaged carbohydrate 142 gm., protein 68 gm and fat 85 gm per day, and as the chief source of vitamin C it included two or three daily servings of raw fruit and vegetables. Some vitamin C may also be assumed to have been derived from the cooked part of the diet.<sup>14</sup> Calculated roughly, the daily average minimum intake of vitamin C on the

hospital diet may be taken as 80 to 140 mg, at least twice as much as the 40 to 60 mg considered as the daily human requirement<sup>15 16 17</sup>

#### METHODS

The method used for the determination of vitamin C was the 2, 6-dichlorophenolindophenol titration procedure of Tillmans<sup>2</sup> For urine the Harris-Ray modification<sup>18</sup> was employed, and for blood the macro procedure as outlined by Farmer and Abt<sup>19</sup> The indicator (La Motte) was dissolved in freshly boiled distilled water (85°C), and was prepared so that 1 cc was equivalent to about 0.05 mg of ascorbic acid The dye solution was standardized against known ascorbic acid (Merck's Cebione) and preserved in a glass-stoppered brown bottle in a refrigerator Under these conditions it maintained its strength for two or three weeks

Our procedure was as follows A fasting blood sample was taken, and immediately afterward 1000 mg of Vitamin C Injectable\* was given intravenously The urine voided during the following five hours, including that voided at the end of the period, was collected and kept in the refrigerator until just before titration As preservative, sufficient glacial acetic acid was used to give the total sample a pH of between 3 and 4 Under these conditions we found no appreciable loss of ascorbic acid during the five-hour interval At the end of the collection period the urine was measured and a convenient dilution (usually 1:100) was made for titration Titration was carried out immediately and completed within one minute There was seldom any difficulty in obtaining a sharp endpoint in the diluted urine sample

The blood plasma was precipitated as soon as possible, and the titration carried out, usually within one hour of collection

For normal values in the saturation test we have used the figures suggested by Wright,<sup>13</sup> who states that normally 400 mg or more of the total 1-gm dose is excreted during the first five hours For fasting blood values we have taken 0.80 mg per cent as the lower limit of normal

#### RESULTS

Table 1 shows the results obtained in 49 of the 77 diabetic cases and Table 2 those obtained in the 6 normal ones Two points are evident First, the vitamin C values obtained in the patients with uncomplicated diabetes were in general within a normal range and compared very favorably with those in the normal individuals, although on the average the latter were at a higher level Second-

ly, the surgical cases tended to have either a lowered blood ascorbic acid or a diminished urinary excretion or both

Of the total of 49 diabetic cases only 6 showed definitely low values in both blood and urine, not only with the blood ascorbic acid under 0.80 mg per cent, but also with the urinary excretion during the five-hour period under 400 mg Of these cases, 4 (Cases 1, 2, 9 and 13) were surgical Therefore in only 2 of 49 cases of uncomplicated diabetes was there any striking indication of vitamin C deficiency

That the fasting blood value usually bears a direct relation to the excretion is also evident from Table 1 In the cases in which a discrepancy may be noted, usually either the blood or urine value is a borderline figure or the patient falls in the surgical group Thus, of 7 cases with blood values under 0.80 mg but with urine excretion over 400 mg, 3 gave borderline figures with excretions under 410 mg Two of these, and 1 other of the 7, were surgical patients Similarly of the 8 cases with blood values above 0.80 mg but with excretion under 400 mg, 5 were surgical cases and 4 had borderline blood values between 0.80 and 1.03 mg

If we omit, therefore, all cases showing low values in which any surgical lesion might be a complicating factor, 9 diabetic patients out of a total of 49 cases gave some indication of a lowered vitamin C status 2 (Cases 3 and 5) showed definite vitamin C deficiency, with blood ascorbic acid less than 0.80 mg per cent and urine excretion for the five-hour period well under 400 mg; 3 (Cases 16, 35 and 48) showed lessened excretion but normal blood values, and 4 (Cases 4, 5, 7 and 12) showed blood values under 0.80 mg per cent but excretion above 400 mg Of the remaining 40 cases, either both blood and urine values were above normal or a surgical complication could account for one or both lowered values Only 1 patient (Case 46), with a lesion of the extremities serious enough to demand operation, had high values in both blood and urine

The results obtained in the first 28 diabetic patients studied were discarded, and the data were not included because certain technical discrepancies were discovered which we felt invalidated the strict accuracy of the figures obtained It is of interest to note, however, that in this group the general findings agree with those already stated In most cases consistent values were obtained in the fasting blood sample and the five-hour excretion, and of those cases showing a low value for the five-hour period 58 per cent were surgical cases

## DISCUSSION

The data presented above indicate clearly that in our series the average patient with uncomplicated diabetes can and does have a normal status as regards vitamin C. It must be remembered that our results were obtained with patients in a private hospital, and that findings in a large public clinic might be quite different. Our results are of significance, however, in ruling out any marked influence of the diabetes per se. The normal status of the patients observed in the present study no doubt reflects the adequate amounts of vitamin C afforded by the fruit and vegetables in their usual diet. With the increasing and laudable tendency to make diabetic diets more nearly like normal ones, this conclusion emphasizes anew the value of fruit, especially citrous fruit, and green vegetables, as included in the classic dietaries for patients with diabetes.

In our study, as previously stated, we have accepted Wright's values as a normal response to his

Table 2 *Vitamin C Findings on Normal Individuals and Effect of Vitamin C on the Blood Sugar of Normal Fasting Individuals*

CASE NO.	INJECT ED	VITAMIN C		BLOOD SUGAR CONTENT					
		FASTING PLASMA CON- TENT	URINE EXCRETION	BE- FORE INJEC- TION	1/2 HR. AFT ER	1 HR. AFT ER	2 HR. AFT ER	4 HR. AFT ER	
	mg	mg %	mg	mg %	mg %	mg %	mg %	mg %	
1	1000	1.46	728						
2		1.69	612						
3		1.55	585						
4		1.22	495						
1	300	1.22		98	98	94	101	103	
2	300	1.41		102	99	100	103		
5	1000	1.79	856	88	89	91	88		
6	1000	1.50	738	96	98	96	98		

saturation test. Ralli's recent work<sup>20</sup> with a series of 12 normal individuals, although she used smaller doses, tends to confirm the validity of Wright's results. Although the term "saturation" is somewhat vague and saturation tests are perhaps justly criticized as creating distinctly unphysiologic conditions, recent investigators seem to favor this method of determining the vitamin C status of an individual. The saturation test based on a single large dose of vitamin seemed more suited to our facilities than one involving a more prolonged period. The size of the dose obviated any slight effect of dietary variations during the test, and the analysis of urine high in vitamin content and preserved only five hours eliminated many technical difficulties inherent in the indophenol titration of urine.

Although the reliability of results obtained by the direct titration of urine with indophenol may be questioned owing to the presence of interfering substances, there is good evidence that

after a large dose of vitamin C the reducing substance in the urine is chiefly ascorbic acid.<sup>21, 22</sup> The suggestion of van Eekelen and Heinemann<sup>22, 23</sup> that the urine of diabetic patients differs from normal urine in its larger content of non-specific reducing material, particularly thiosulfate, has not been apparent in our work. In view of the experiments of Heinemann,<sup>24</sup> no particular difference would be expected provided that there was no evidence of abnormal protein catabolism in the diabetic patient and that his protein intake corresponded closely to that of the normal controls.

As regards any difference between the normal and the diabetic individual in retention of ascorbic acid, our results, as evidenced in Tables 1 and 2, are in entire disagreement with those of Schroeder,<sup>9</sup> to whose work reference has been made. He asserts that after a given dose the diabetic patient retains a much greater proportion of ascorbic acid than does the normal individual and that with an intravenous injection of 150 mg the retention may reach 97 per cent, even if the injection is repeated for several days, similarly 91 to 97 per cent was retained after the oral administration of 300 mg. These figures imply an excretion of only 3 to 9 per cent. From a study of the literature on urinary excretion and retention with which we are familiar, no explanation of such a low excretion seems probable except a diet definitely poor in vitamin C. It would be of interest to know the vitamin C content of the "usual diabetic diet" referred to by Schroeder, and also the blood ascorbic-acid levels of his patients.

It may be observed from Table 1 that several of our patients showed high fasting blood-sugar values. Ralli's<sup>25</sup> statement that the reabsorption of vitamin C and that of glucose do not involve a common mechanism justifies us in assuming that vitamin C absorption and excretion are independent of glucose absorption and excretion, and that high blood-sugar values probably do not influence vitamin C results.

Surprising to us were the low values obtained for both blood and urine ascorbic acid in surgical cases. These results were unexpected because, realizing the influence of infections on the vitamin C requirement, we carefully chose surgical patients long removed from active infection and from any surgical procedures. Our tests on this group were usually performed just prior to the patient's discharge, at a time when local lesions were uninfected and insignificant. The surgical patients were without exception those whose lesions were of the extremities. Because of the nature of the operations and of the anesthesia (usually low spinal), surgical procedures caused little or no interruption to the usual diet. It



seems likely that the generally lower economic status of the patients in the surgical group was partly responsible for the lower vitamin C values obtained

In order to detect any possible hypoglycemic action of vitamin C, in a considerable number of cases the blood sugar was followed during the saturation test. Table 2 shows the results obtained with normal individuals in the fasting state. These persons obviously were in excellent vitamin C nutrition. It is clear that the injection of either 300 or 1000 mg of ascorbic acid had no effect whatever on the blood sugar.

In the diabetic cases similarly studied the blood sugar was followed first on a control day, and then on the day on which the injection of 1000 mg of vitamin C was made. Determinations were made before injection and at two-hour intervals afterward for a period of six hours. These patients and the 4 normal individuals likewise treated were not fasted, and the unavoidable variations in blood sugar, particularly in the diabetic cases, due to intake of food make the results difficult to interpret. The data, though not presented here, confirm, however, the completely negative findings secured with the fasted normal individuals. Our results suggest, therefore, that vitamin C has no significant effect on the blood sugar of individuals in good vitamin C nutrition. Whether the point of good vitamin C nutrition is a fundamental one we are not in a position to state, but the work of Sigal and King<sup>26</sup> suggests that possibility. They found a significant rise in fasting blood sugar and a distinctly lowered glucose tolerance in guinea pigs kept for ten to twenty days on a diet depleted in vitamin C but normal in other respects. A striking return to normal was found within fifteen days after vitamin C was restored. If a deficient diet incident to poor economic conditions causes in some large groups of diabetic patients a condition bordering on a state of subclinical scurvy, this work may offer an explanation of some of the conflicting reports in the literature.

#### SUMMARY

The vitamin C status of 77 adults with diabetes mellitus was determined. Results are reported in detail for 49 patients.

Patients with uncomplicated diabetes whose vitamin C intake had been adequate showed levels of blood ascorbic acid (fasting) above 0.80 mg per cent, and excreted in five hours upward of 400 mg of ascorbic acid in the urine in response to a 1000-mg test dose given intravenously.

Patients confined to bed with surgical lesions, usually of the extremities, even with no fever or

apparent infection, tended to show low normal or subnormal values. This may in part reflect a deficient vitamin C intake (prior to hospital admission) incident to an economic status lower than that of the majority of the patients studied.

With 4 normal individuals in good vitamin C nutrition no effect on the blood sugar could be observed after the intravenous injection of either 300 or 1000 mg of ascorbic acid.

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## CYSTOCELE REPAIR\*

Factors Which Necessitate Changes in the Usual Procedure,  
With Suggested Technics

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THIS paper discusses some of the complicating situations which make it necessary to alter the usual methods employed in the repair of cystocele. Such repairs are usually a part of more general prolapse operations, and it is unavoidable that the larger problem of prolapse repair be also discussed here. In the last few years I have been surprised to note how frequently such complications are seen, and have observed that little help for the inexperienced operator is to be found in textbooks.

An almost infinite variety of situations may be present. Correct evaluation of the various factors involved and judicious variation of operative methods are necessary if a result satisfactory not only to the surgeon but to the patient is to be obtained. Only a few of the complicating situations will be discussed, and it is assumed that there has been a general acceptance of the thesis that hernias of the uterogenital hiatus are most advantageously repaired by the vaginal route. The general principles of such repair were admirably summarized two years ago by Ward<sup>1</sup> in an address before the British Congress of Obstetrics and Gynecology.

Suspension of the uterus or abdominal fixation has little place in this field, and such operations frequently interfere with an adequate vaginal repair if this is necessary at a later date. Several years ago I discussed before this society the case of such a patient, whose prolapse had been subjected on three previous occasions to abdominal suspension. At the last operation an actual fixation of the fundus to the abdominal wall was done, this fixation held the uterus but a large cystocele recurred. I was able to obtain a lasting satisfactory repair by cutting loose the fundus from its abdominal attachment, closing the abdomen and immediately performing a vaginal hysterectomy with the usual repair. Several other cases have been seen in which a well-sustained round-ligament suspension operation made subsequent repair of a cystocele quite difficult.

It is a *sine qua non* in plastic surgery that ideal conditions must obtain, especially as regards infection, before a successful operation can be contemplated. It is my belief that no cystocele or

other major vaginal repair work should be done in the presence of a complete tear of the anal sphincter. Certainly this is true if such a tear allows incontinence of feces sufficient to alter the bacterial flora of the vagina. In such cases it is wiser to repair the anal sphincter first and complete other vaginal procedures at a later date. Fortunately this complication is seldom seen, for complete perineal tears are most likely to occur in the patient who has a funnel pelvis, the narrow pubic arch not only forming a secure attachment for the connective-tissue support anterior to the cervix but protecting this area from injury by the baby's head during delivery. I have, however, operated on 2 such patients by the two-stage procedure.

Where the cystocele presents the principal lesion from the points of view of both symptoms and deformity, I have found the interposition, or more properly the transposition, of the uterus a highly valuable and satisfactory method. The cervix is amputated whenever it is diseased, but this complicates the operative procedure, and in recent years I have been inclined to give up the interposition operation where the cervix had to be amputated and to perform the so-called Manchester type of operation instead. The interposition operation is further limited in its scope by the following considerations: the uterus must be approximately normal in size, cancer must be ruled out and further childbearing must be eliminated. If an enterocele is present its repair complicates the interposition operation and makes me favor the Manchester procedure or vaginal hysterectomy. I have also found the interposition operation a poor method where there is more than first-degree descent of the uterus. On the other hand, many patients having a cystocele with partial incontinence have been greatly benefited by the interposition operation, owing, no doubt, to the pressure of the transposed fundus against the symphysis. Whenever the intra-abdominal pressure is increased, this pressure of the uterine fundus is sufficient to compress the urethra and control the voluntary type of incontinence.

Poor results of prolapse repairs are frequently due to a failure to recognize and obliterate properly an enterocele or cul-de-sac hernia. I recently saw a patient of seventy-five with a pro-

\*Read at the annual meeting of the New England Surgical Society, Boston, September 30, 1938.

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trusion of the cervix outside of the vulva. She had just been operated on suprapubically for relief of a large bladder stone. Ten years before this, one of my gynecological colleagues had repaired the cystocele but had failed to amputate quite enough of the cervix or to repair a deep enterocele. The cystocele repair was perfectly sustained, although the cervix was pulled too close to the symphysis. This undoubtedly accentuated the cul-de-sac hernia and placed the cervix far in front of the mid-axis of the pelvis in a position where prolapse was inevitable. I believe that the bladder stone, the result of chronic cystitis, was due to a sacculation of the bladder not in its usual cystocele area but on top of and behind the atrophied uterus. Pessaries are of no use in a case of this sort, and proper repair at the present time involves considerable risk. This case is discussed not only from the point of view of failure to repair the enterocele but to emphasize the necessity of locating the cervix in, or if possible behind, the mid-axis of the pelvis where some support may be obtained from the perineum.

That perineal support is not always effectual, however, is shown by the following experience. Six years ago I operated on a patient fifty years old to repair a large enterocele and rectocele, building up so high and firm a perineum that there was subsequently considerable complaint from dyspareunia. Two years ago the patient had an emergency laparotomy for gangrene of the omentum, and during convalescence considerable straining occurred due to vomiting. Almost immediately after convalescence she noted increasing symptoms from a cystocele which was not present at the time of my first operation. Repair of the cystocele and urethrocele was done although an extensive perineotomy was necessary. While no well-developed cystocele was present when I first saw this patient, I feel reasonably certain that there must have been some recognizable weakness of the pubocervical tissue. I do not advise routine repair of the anterior vaginal wall, but I do believe that even slight weaknesses of this tissue should be repaired, especially in women who may subsequently be called on to do heavy work. This is especially true where the operation is done before the menopause has set in, and where due regard must be given to the possibility of future hernia caused by the atrophic process of the menopause.

One year ago I was faced with a very unusual complication in a patient of only fair physical condition, aged seventy. She had a second-degree prolapse of the uterus with cystocele and rectocele and a true prolapse of the urethral mucosa. About half the urethral wall had everted, form-

ing a mushroom-like tumor 3.5 cm in diameter, portions of which were gangrenous. The patient was immediately sent to the hospital, and the prolapse of the urethra was reduced and corrected by the ingenious method devised by one of our members, Dr. Thomas N. Hepburn.<sup>2,3</sup> This method consists, as is well known, of an extra-peritoneal suprapubic incision, rapid blunt dissection of the space in front of the bladder and urethra, and suspension of the urethra and bladder neck to the posterior wall of the symphy-

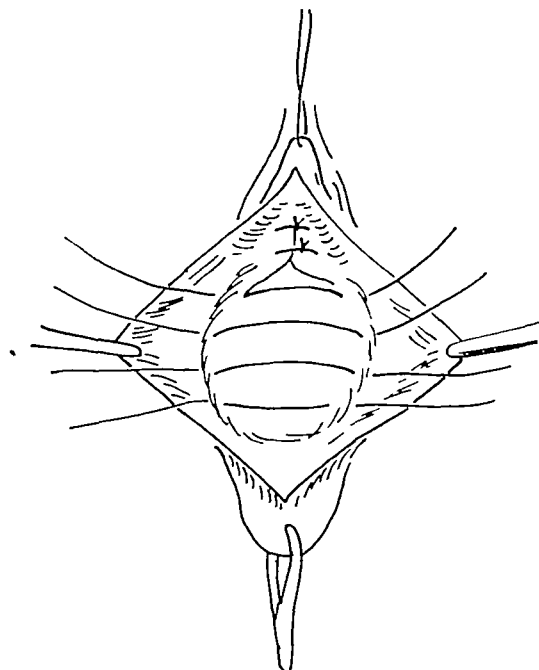


Figure 1 A Commonly Employed Method of Reduplicating the Bladder Fascia

*In the Manchester type of operation the lower sutures also grasp the anterior surface of the uterus. Inadequate attention to the bladder neck and middle urethral sphincter is illustrated.*

sis, the upper sutures fastening the wall of the bladder just above the bladder neck to the undersurface of the rectus fascia near its insertion in the symphysis. This patient voided voluntarily and made an uninterrupted recovery without permanent damage to the urethral mucosa. In order to prevent the cystocele and prolapse from dragging down the suspended urethra a Gellhorn pessary was worn for four months, and the prolapse was then repaired by the Le Fort method. Subsequent examination showed that the urethra had retained its high position, that there was no recurrence of prolapse, and that the patient was perfectly comfortable.

Ordinarily the patient with a cystocele is interested in two things, the relief of protrusion, and

the relief of partial urinary incontinence or difficulty in emptying the bladder. Any of the usual methods will satisfactorily overcome the protrusion, but a complete restoration of normal urinary function is a more difficult affair. We distinguish two types of incontinence: that due to inadequacy of the involuntary bladder-neck sphincter, which occurs usually at night, and that which occurs on coughing and sneezing owing to inadequacy of the voluntary middle sphincter of the urethra. Kennedy<sup>4 5 6</sup> has shown that the middle sphincter is functionally and anatomically a portion of the levator musculature, and that this type of incontinence is due either to a stretching of this sphincter or distortion of the lumen of the urethra.

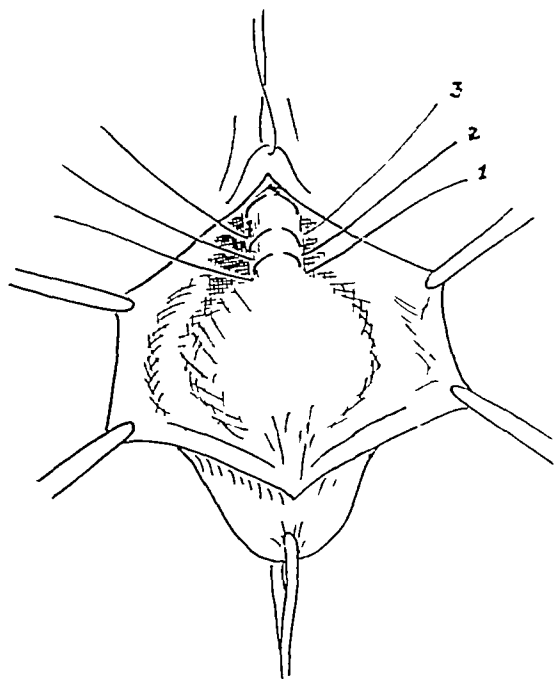


Figure 2. Showing the Extensive Lateral Mobilization Necessary to Allow Adequate Repair of the Urethral Sphincters

*Mattress sutures are placed so that the supporting sling of the middle sphincter is reconstructed; this elevates the urethra and bladder neck.*

by scar-tissue contraction of lacerations of the sphincter. Satisfactory results can be obtained by freeing the entire posterior surface of the urethra and removing any distorting scar tissue, following this by reefing of the middle sphincter with mattress sutures, placed in the same manner as advocated by Kelly for incontinence at the bladder neck.

Kennedy's work has called attention to one of the principal sources of dissatisfaction in cystocele repair operations, and he emphasizes a point which many of us have already observed, namely that

many women with a complete prolapse have no incontinence on straining until the floor of the bladder has been elevated by what seems to be an adequate pelvic repair. We are then surprised to find that incontinence on straining is almost a worse complaint than the previous prolapse. It is obvious that we must recognize the need for proper repair of the middle sphincter when we are repairing the bladder hernia.

Since following Kennedy's procedure I have had fewer failures in this regard. The operation is much more radical, and carries with it the necessity of catheter drainage for one or more weeks postoperatively. Employment of a retention catheter for at least five days is useful. Bladder irrigations are given from the first day until well after voluntary urination and complete emptying have been observed. It is useful to pass a urethral sound if the patient has been unable to void by the tenth day, in order to dilate the urethra, which may have been repaired too snugly. Giving bladder irrigations from the start has minimized the incidence of postoperative cystitis. During the last year I have been forced to perform this operation on several patients who had previously had what seemed to be an adequate cystocele repair.

One of the most interesting complications which we meet is the presence of a cystocele and a fair-sized uterine fibroid tumor in the same patient. When first seen, especially if the fibroid involves the cervix or the lower fundus, the cystocele may not be in evidence, and may not be noted until a later date if a supravaginal hysterectomy be done. If, however, a total hysterectomy is performed, one is able to observe the enormous dilation of the vagina and to note the presence of a cystocele. Following the work of others and inspired by watching Dr. Joe V. Meigs, I have with great satisfaction combined total hysterectomy with repair of the cystocele done by the abdominal route. This is made more difficult by extreme obesity, and necessitates the careful disinfection of the vagina before operation. I have found it to be a straightforward procedure which has given excellent postoperative results and which can be performed as quickly as if done from below. The repair of the perineum and rectocele can be done at the close of the operation if the patient's condition warrants. There is only one technical drawback to this procedure: it is not so easy to repair a urethrocele and an inadequate middle sphincter as it is by the vaginal method of Kennedy. In one case I tried with only partial success to do this by combining total hysterectomy and cystocele repair with a suspension of the urethra as proposed by Dr. Hepburn. The follow-up showed an entirely adequate result so far as the cystocele

was concerned, although there remained some rolling down of the suburethral structures. The urinary function, however, was quite normal, and a subsequent urethral repair of the Kennedy type may be done if necessary.

Serious physical debility caused by old age or by any major organic disease is not necessarily a bar to successful reconstructive pelvic surgery, although a proper choice of anesthesia and operative technics which cause little strain are necessary. In the feeblest patient one can afford marked relief by the Le Fort operation and I have been especially impressed with the modification of this technic suggested by Goodall and Power,<sup>7</sup> of Montreal. This modification lends itself most easily to include an adequate repair of the urethral sphincter and of the rectocele.

#### CONCLUSION

This paper has presented only a few of the many complicating situations met with in reconstructive vaginal repair work. In no branch of surgery do experience and ingenuity count so largely for success as in plastic work. We should study most carefully our failures, for, as Carlisle said, "It is more profitable to reckon our defects than to boast of our successes."

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#### DISCUSSION

DR. JAMES B. WOODMAN, Franklin, New Hampshire. One thing in Dr. Miller's very interesting paper which impresses me is his assertion that no one type of operation for cystocele seems applicable to every case. That this must be so becomes evident when we consider that there are first, second and third degrees of prolapse, all accompanied by more or less stretching and dragging down of the bladder and rectum. There are also those cystoceles and rectoceles which have little if any prolapse.

The fact that we have run the gamut of operations, from the old Emmet butterfly procedure to the interposition operation and vaginal hysterectomy, and are still looking for a more satisfactory method, indicates that Utopia has not been reached, and that each case presents a problem in itself.

I have frequently seen cases of prolapse and cystocele in which operation has been followed by recurrence. In treating several of these I used a procedure described some

years ago by the late Dr. H. L. Smith, of Nashua. This operation seems most applicable in the cases of old women where there is a marked postoperative cystocele, with a highly mobile uterus and some degree of secondary prolapse, and in which there is no connecting band between the fundus of the uterus and the abdominal wall. The cervix is grasped and drawn down. An elliptical plate of mucosa from the anterior vaginal wall is taken off down to the bladder musculature. The anterior edge of this section should be about 2 cm. behind the urinary meatus, and the denuded portion toward the cervix should include that structure, the cervical surface being denuded deeply and nearly to the margin of the cervical os. These two points are the most important ones of the procedure, and their observance will prevent later protrusion of the cervix.

The denuded elliptical area is closed with chromic catgut sutures in a transverse line up to the cervix on both sides. Two heavy sutures are passed in an anteroposterior direction through the sides of the cervix close to the denuded section, and up under the symphysis pubis on each side of the urethra. They should be passed close to the bony structure to ensure firmness. If the uterus is freely movable the fundus will tip backward until it rests on the perineum, but it has presumably been drawn far enough forward so that there is no pressure on the sacrum. The longitudinal axis of the uterus lies across the vaginal outlet, with the cervix, which was formerly the spearhead of the escaping cone, well anchored under the urethra and the fundus resting on the perineum. At this point perineal repair, which is usually necessary, is done by the Mayo method, in order to provide a firm shelf for the posterior wall of the uterus. In one or two cases I have anchored the cervix too far forward, which left it unnecessarily low in the vagina. This difficulty may be largely overcome by placing the sutures farther back under the symphysis pubis.

From an anatomical viewpoint this procedure is peculiar, but it has been useful, and seems to give adequate relief from a trying condition.

DR. JOHN ROCK, Brookline, Massachusetts. Since few women in childbirth entirely escape damage to the pubo-cervical ligament, and cystocele is thus such a common complaint, Dr. Miller has chosen a subject very appropriate for discussion. Since Emmet in the seventies popularized the method of denudation of the vaginal walls and of the development of epithelial flaps, a great deal of water has passed under the arch, so that although the underlying principle of the repair of bladder hernia is still but the application of anatomical knowledge, one now expects the surgeon to understand the art of dissection and reconstruction, and especially, as Dr. Miller points out, to discriminate in the choice of which anatomic factors to utilize. He properly reminds us that suspension of the uterus will not by itself hold the bladder out of the vagina. When herniation of the bladder occurs it is not because its uterine attachment has descended, but because fascial support between the cervix and the symphysis has been weakened. For a permanent cure, reconstruction of this support is necessary.

Dr. Miller warns against repairing the anterior wall and a complete perineal tear at the same time. At the Free Hospital for Women it is customary to repair both simultaneously, since we have no appreciable trouble from breakdown of the anterior plastic, even when the posterior wound has supplicated. Dr. Frank A. Pemberton, following the late Dr. William P. Graves, emphasizes the importance of careful hemostasis, as well as the necessity in all plastic work, of tying all sutures without great tension,

for he believes that breakdown of a wound in the vagina is likely to result from retained blood clot and the cutting through of sutures

The Watkins interposition operation has never been a favorite with us. We seem to obtain equally good results in the repair of large cystoceles associated with normal uteri, with or without elongated cervixes, by advancement and reefing of the bladder, reconstruction of the pubocervical ligament and amputation of the cervix if necessary, without the gross interference with normal anatomy which the interposition operation entails. Like others, we have found that abdominal suspension of the uterus is unnecessary if such repair is accomplished below, unless there be prolapse or symptoms of retroversion. If the cystocele is accompanied by prolapse of the normal uterus, the latter is relieved by approximation of the cardinal ligaments in the midline, which shortens them and thus lifts the uterus—the so-called Fothergill or Manchester technic. Such a procedure is commonly expected to interfere with a subsequent delivery from below, so that in certain women it may properly be accompanied by ligation and transection of the tubes, a comparatively simple adjunctive procedure when done after advancement of the bladder and before reconstruction of the pubocervical ligament.

Dr. Miller emphasizes the importance of careful routine search for enterocele, which so often accompanies prolapse. If present the sac is developed and excised, the stump being attached to the posterior wall of the cervix, provided this has not been removed. If complete hysterectomy has been performed, the stump, together with the uterosacral ligaments, is attached to the base of the broad ligaments. For procidentia we do a vaginal hysterectomy or a Fothergill operation, or a colpocleisis, as seems indicated by the degree of prolapse, the condition of the uterus and the age and condition of the patient.

In all our cystocele operations, exposure and approximation of the subepithelial tissue is carried well forward and laterally to include the region under the neck of the bladder, in accordance with the teaching of Kelly, and later of Kennedy, that support here is essential for the relief of incontinence.

I have never excised redundant vaginal epithelium from above in the course of a complete hysterectomy. When hysterectomy is contemplated, vaginal examination under anesthesia is made, as it is before every abdominal operation, and we believe that the relaxation of the vagina and the cystocele can be diagnosed more accurately and be repaired more safely from below, before the abdomen is opened.

In agreeing as to the value of the Le Fort operation in elderly women, I should like to mention also the advantage of local anesthesia combined with morphine and scopolamine in suitable subjects. At the Free Hospital lately four operations in women over eighty and many others in slightly younger women have been easily and smoothly done, with no complications and with good results.

I am grateful for this opportunity to emphasize Dr. Miller's advice that varying anatomic and pathologic conditions necessitate various operative procedures, and that the surgeon when applying them must be ever aware both of the physiology of bladder control and of subsequent demands on the vagina.

DR. JOE V. MEIGS, Boston. Ten years ago I operated on a girl with a fibroid. As she had a moderate endocervicitis I cauterized the cervix. Seven years later she came back with cancer of the cervix. Four years ago I operated

on another woman with abnormal uterine bleeding, cauterized the cervix and removed the uterus supravaginally, three years later she developed cancer of the cervix. Both patients are dead, but both would be alive if total hysterectomies had been done. I have no faith in cauterization of the cervix as a prophylaxis against cancer. Since then I have leaned more toward total hysterectomy. I formerly endeavored to use Schiller's test and the colposcope to determine when the cervix was dangerous and when it was not, but without complete success. Now if I see what I think is a dangerous cervix, I remove it. If a patient with such a cervix needs abdominal surgery, I believe that a total hysterectomy should be done.

I have puzzled about the repair of a cystocele when doing a total hysterectomy. I had found that on dissecting the bladder free in front of the uterus I ran into the sutures I had used below in the repair of the cystocele, so I discarded that method. It is easy to remove a sufficient amount of anterior vaginal wall from inside to cure the cystocele, as the vagina is pushed off the bladder wall as large a piece as is needed can be removed. When the patient is turned around into lithotomy position it is obvious that the bladder is held sufficiently high and the cystocele has disappeared. Since first adopting this procedure I have operated on 50 or 60 cases in the same way.

If abdominal surgery is to be done, it should come first, as the major consideration to repair a cystocele or perineum, or amputate or repair a cervix, with consequent loss of blood and consumption of time, followed by an abdominal operation, is an incorrect approach if it can be avoided. Vaginal examination and preparation should precede the abdominal operation, following which the patient is again placed in lithotomy position and the perineum is repaired. Occasionally a urethrocele is denuded and sutured.

In repairing urethroceles by the Kennedy method I have found fine silk sutures a great help, the knots are very small and more sutures can be taken. I have done about 15 repairs in this way, and in no case has a wound broken down or have sutures had to be removed.

DR. THOMAS N. HEPBURN, Hartford, Connecticut. Dr. Miller has asked me to speak of the technic of the operation which he has used for urethral prolapse. This type of urethral prolapse is more than what Dr. Miller referred to as a "mucosal prolapse." It involves the whole urethral wall. When I first saw this condition eighteen years ago in a child five years old, I was at a loss as to how to treat it, because all the literature at that time referred to circumcision as the only possible treatment. The prolapse impressed me, however, as a true sliding hernia, requiring treatment as such.

A suprapubic, prevesical, extraperitoneal incision is made, following which the bladder neck falls away under the exploring finger. It requires no pressure to run the hand down under the symphysis and around the urethra. With the child's legs separated and an assistant looking at the urethra, traction is made on the bladder. The prolapsed urethra is easily pulled back with the bladder traction until the assistant announces that the hernia has disappeared, the bladder is then sutured to the periosteum behind the symphysis. This holds it in perfect position.

I am very thankful to Dr. Miller for having adopted this operation. I have had occasion to do it only four times, and I am sure that if any of you are confronted with the problem of urethral prolapse you will find this a very simple and satisfactory procedure.

DR. OLIVER N. EASTMAN, Burlington, Vermont. There are so many advantages in removing the uterus vaginally

instead of by the abdominal route that I advocate this operation whenever conditions warrant. I wish to describe briefly a procedure which has served me well in the repair of cystocele. I am able to report 300 cases in which I have employed it, and the results have been highly satisfactory.

After the uterus has been removed from below, the lateral uterine supports are approximated in the midline below the closed peritoneal cavity. The redundant mucous membrane is removed from the anterior vaginal wall, well up to the base of the urethra. Two sutures of No 2 chromic catgut, one below the other, are utilized to close the bladder hernia. They pass through the mucosa, catching the pubic fascia, and laterally through the vesicocervical fascia to the anterior portion of the body formed by the union of the lateral uterine supports, catching the vesicocervical fascia on the opposite side and then the mucous membrane opposite the entrance of the suture. If a cul-de-sac hernia is present, similar sutures of a purse string nature pass through mucosa and into the posterior portion of the central body. Lateral sutures pass through the mesial portion of the body and out on the opposite side. These sutures, designated as tension sutures, are allowed to remain lax until the vaginal mucosa and deeper structures are approximated by interrupted sutures. The tension sutures are then drawn moderately snugly, causing the vault of the vagina to assume a high position and effectually closing the space anteriorly and posteriorly to the central body.

In 18 cases in my series the patients were over seventy years of age and the operation was performed with local anesthesia, the tissues being infiltrated with 1 per cent novocain. Senility does not seem to be a deterrent factor, as the results are as good as in younger individuals. As a rule, also, the operation is more easily done because the tissues are less vascular. A retention catheter affords relief from bladder distention and obviates frequent catheterization.

A checkup on most of these cases has shown highly satisfactory postoperative results.

DR. CHARLES LARKIN, Waterbury, Connecticut. Dr Miller said that in some cases of procidentia it is impossible to perform an interposition operation on account of the large size of the uterus. I venture to suggest that these large uteri may be shrunk to normal size by cauterizing the nabothian cysts or the erosions or eversion of the cervical lips which are so often present, or one may use the method advocated by Dr John Fallon, of Worcester, to shrink the uterus by inserting well screened radium into the uterine cavity. In about six weeks the uterus shrinks enough to permit this operation.

DR. MILLER (closing). I am not familiar with Dr Smith's operation, reported by Dr Woodman, but it recalls a similar one which I recollect as coming from Texas. With regard to not combining the repair of a complete tear with that of a cystocele, I believe that the men at the Free Hospital for Women probably take scrupulous care to obtain a normal flora in the vagina, which after all is the essential thing. The interposition operation is possibly finding less and less place. I certainly have found it so, but there are some occasions where with moderate incontinence it is a quick way out of the difficulty.

Dr Meigs emphasized the importance of doing the abdominal surgery first. That certainly is one of the most important things brought out by this discussion. My paper did not concern itself with the ordinary type of cystocele and prolapse, but dwelt on some of the abnormal features which make us alter our technic, the need for doing the abdominal surgery first is one of these.

I should like to emphasize what Dr Hepburn pointed out—that the dissection behind the symphysis is extremely easy. In this type of operation it is surprising to find that there is absolutely no supporting connection between the urethra and the symphysis. The bladder neck falls away as soon as the superficial tissues are separated.

## REPORT ON MEDICAL PROGRESS

## THE FAT-SOLUBLE VITAMINS\*

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THE object of this article is to summarize contemporary knowledge of the fat-soluble vitamins, emphasizing particularly the facts of most interest to practicing physicians. To achieve this in a short space, it has been necessary to eliminate historical and bibliographical details, and to curtail discussion of controversial questions. For more complete treatment the reader is referred to the papers and reviews listed at the end of this article, and particularly to the series of articles which have appeared in the *Journal of the American Medical Association* during 1938. A similar article, dealing with the water-soluble vitamins, will appear subsequently.

## VITAMIN A

**Chemistry** Vitamin A has been isolated in chemically pure state, and its successful synthesis has been reported recently.<sup>1</sup> It is an unsaturated alcohol with the formula  $C_{20}H_{20}OH$ , and is a colorless compound chemically related to the carotenoids, a class of pigments widely distributed in plant tissues. Four of these pigments can be converted by the animal body into vitamin A, and are therefore called provitamins. The commonest and most important of these provitamins is  $\beta$  carotene.

**Physiology** Vitamin A is absorbed in the intestine, passes into the blood stream via the thoracic duct and is stored in the liver. Carotene probably requires the presence of bile salts and fatty acids for its absorption. It passes directly into the blood stream and is taken up by the liver, where it is converted into vitamin A. Vitamin A is an essential constituent of visual purple (rhodopsin), a pigment found in the rods of the retina. Visual purple is necessary for the normal function of the rods in the appreciation of dim light.<sup>2</sup> Nothing is known of the biochemical action of vitamin A in other tissues.

**Pathology** Vitamin A deficiency in laboratory animals is characterized by a morphologic disturbance of epithelial surfaces. The primary change is atrophy of the epithelium, followed by proliferation of the basal cells, resulting in the replacement of normal epithelium by a stratified keratin-

ized layer resembling epidermis.<sup>3</sup> In the bronchial tree this lesion may block the small bronchi with epithelial plugs and give rise to localized bronchiectasis, atelectasis and, frequently, patchy pneumonia. In the cornea of the eye, xerophthalmia results, though generally late in the course of the deficiency. Similar changes can occur in the ducts of glands and in the urinary and genital organs. In the pelvis of the kidney this may predispose to the development of renal calculi, which sometimes occur in animals deficient in vitamin A. There is no general agreement however that calculus formation is a specific effect of vitamin A deficiency.<sup>4</sup> The normal development of teeth is also impaired by vitamin A deficiency.<sup>5</sup> While it has been reported that demyelination of the spinal cord and peripheral nerves can occur in deficient animals,<sup>6</sup> not all workers have found such lesions.<sup>7</sup> Growth is restricted in young animals suffering from vitamin A deficiency, but this is no more a specific effect than the lack of growth that occurs in deficiency of many other essential dietary constituents—other vitamins, essential amino acids and mineral salts.

Epithelial metaplasia similar to that found in animals may occur in man as a result of vitamin A deficiency. Xerophthalmia, though rare and a sign of severe deficiency, has been reported in this country.<sup>8</sup> Children with xerophthalmia succumb very easily to respiratory infections.<sup>9</sup> Skin changes, characterized by hyperkeratosis and absence of sweating, sometimes occur.<sup>10</sup>

Probably the most important effect of mild vitamin A deficiency is night blindness (hemeralopia). Subnormal dark adaptation can be detected with a photometer, and frequently occurs in apparently healthy people.<sup>11</sup> While there are certain difficulties in accepting photometer readings as a definite criterion of vitamin A nutrition,<sup>12</sup> there is no doubt that vitamin A therapy may result in striking improvement of subnormal dark adaptation. The importance of nutritional hemeralopia in automobile drivers has been stressed recently.<sup>13</sup> "Glare-blindness" (nyctalopia), occurring after exposure to bright headlights, may also be due to vitamin A deficiency.

**Assay and Units** The vitamin A content of biologic substances is estimated by feeding tests on growing rats, by a color reaction with antimony trichloride or by spectrometry.<sup>14</sup> The last is prob-

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ably the most accurate method. Feeding tests measure the total vitamin A activity (both vitamin and provitamin). The other methods measure only the vitamin, although the spectrometric method can be utilized to estimate carotenoids separately. Depending on which method is employed, different units are currently in use to express the vitamin A potency of foods. The Sherman and international (USP) units\* are used when the assay has been done by rat feeding tests. Lovibond blue units are used as a standard in the antimony trichloride color reaction, and the readings obtained by spectrometry are converted to international units by the use of a factor. This confusion is made worse by the fact that there is at present no general agreement on how many units of one standard correspond to one unit of another. Probably the best figures at the present time are as follows:<sup>14 15</sup> 1 Sherman unit is equivalent to 14 international units, 1 blue unit is equivalent to 20 to 30 international units, and the factor most generally used to convert spectrometric readings into international units is 1/1600.

*Sources of Vitamin A and Carotenoids* The most important sources of vitamin A in the human diet are milk, butter, eggs and liver. Carotenoids occur in association with chlorophyll and are therefore present in green vegetables, but not in the pale lettuce leaves which make up the ordinary salad. Carrots and sweet potatoes are good sources of carotenoids and derive their color from them. While color is an index of the provitamin content of milk and eggs, it is not a measure of the amount of the colorless vitamin present in these foods. Canning and cooking do not seem to alter the vitamin A activity of foods.

When it is necessary to supplement the diet with some more potent preparations, fish-liver oils should be used. Cod-liver oil is the most familiar preparation. The U.S.P. dose for infants is 1 teaspoonful (4 cc), and for adults 2 teaspoonfuls (8 cc) daily. The latter amount contains from 5000 to 10,000 IU (international units). Halibut-liver oil has usually from fifty to one hundred times the potency of cod-liver oil. The recognized dose (N.N.R.) for infants is 6 to 10 drops (0.15 to 0.25 cc) daily. A suitable dose for adults is 10 to 20 drops (0.25 to 0.50 cc) daily, it has the advantage that it can be taken easily by patients who find cod-liver oil unpalatable. In most cases, cod-liver oil is preferable, since cases of vitamin A deficiency may also be deficient in vitamin D, and cod-liver oil contains more vitamin D per dose than does halibut-liver oil. Furthermore the additional animal fat has nutritive value. In cases of severe de-

ficiency, amounts considerably larger than the official dose may be given with safety.

*Human Requirements* The probable minimum requirement of an average man is about 2000 IU a day, but due to variation in human weight and activity and in the vitamin content of foods, it is suggested that 3000 IU daily provides a safer margin in calculating dietary allowances.<sup>16</sup> This amount is obtained by the daily consumption of two glasses (500 cc) of milk, one egg, three pats of butter (30 gm) and a moderate helping of green vegetables.<sup>17</sup> Children probably require at least as much as adults. Infants will receive sufficient vitamin A if they are given cod-liver oil in the amounts recommended in the subsequent section on vitamin D.

*Therapeutic Uses* Vitamin A therapy is essential in cases of severe deficiency with xerophthalmia and skin lesions. Patients who complain of night blindness or in whom photometer tests show an abnormal dark adaptation should receive a diet rich in vitamin A, and if necessary additional supplements of the vitamin in the form of cod liver or halibut-liver oil. In cases of infection, particularly of the respiratory tract, attention should be paid to the dietary history, and if this seems to indicate that the vitamin A intake has been low, additional vitamin should be given. It is a commonplace that ill-nourished individuals withstand infection poorly, and though it is by no means certain to what extent vitamin A deficiency usually contributes to this lowered immunity, its possible influence should not be overlooked. In pregnancy, additional vitamin A may be beneficial. A quart of milk a day supplemented by two teaspoonfuls (8 cc) cod-liver oil may be recommended as an addition to the usual diet. There is some evidence that additional vitamin A during pregnancy may reduce the incidence of puerperal infection,<sup>18</sup> although other more important factors are probably concerned. In addition it may possibly ensure that the colostrum and first milk is well supplied with the vitamin, this may be important in view of the fact that the livers of newborn babies contain very little vitamin A. Care should be taken to provide for an adequate vitamin A consumption in patients with a limited food intake from whatever cause. Vitamin A absorption is probably impaired in steatorrhea, and in liver diseases the storage of vitamin A may be disturbed, such cases possibly benefit by receiving additional amounts of the vitamin.

There is no good evidence that an excess of vitamin A in the diet of an individual already well supplied will lead to any increased immunity to infection. Its use as a prophylactic against colds

\* One international or U.S.P. unit is defined as having the biologic activity of 0.6 micrograms of pure  $\beta$  carotene.

and influenza has no justification if the diet is adequate. It is doubtful whether vitamin A supplements have any beneficial effect in thyrotoxicosis, demyelination of the spinal cord, sexual disturbances or anemia.<sup>4</sup> It is probably ineffective in the treatment of urinary calculi<sup>18</sup> and in the local treatment of skin lesions.<sup>4</sup>

#### VITAMIN D

**Chemistry** Vitamin D is not a single chemical entity, there are a number of known compounds which show vitamin D activity.<sup>20</sup> They are all sterols or steroids, and therefore chemically related to cholesterol and the sex hormones. Probably only two have practical importance. These are calciferol (vitamin D<sub>2</sub>) and vitamin D<sub>3</sub>.<sup>\*</sup> These substances are formed from inactive provitamins by the action of ultraviolet light. The provitamin of calciferol is ergosterol, a substance found in yeast and fungi, but not in ordinary human diets. The provitamin of vitamin D<sub>3</sub> is 7-dehydrocholesterol, which is present in animal fats, liver, milk and butter. The conversion of provitamin to vitamin can take place in the human body if the skin is exposed to sunlight or to rays from an ultraviolet lamp.

**Physiology and Pathology** Vitamin D controls the retention of calcium and phosphorus in the body. Deficiency of the vitamin increases the amount of calcium and phosphorus lost in the feces, and may decrease the concentration of these elements in the blood. In infants the following pathologic changes result: the deposition of calcium salts at the growing points of the long bones is delayed, and the amount of cartilage and osteoid tissue between epiphysis and diaphysis increases, the bones are deficient in calcium salts, and the development of teeth is impaired.<sup>21</sup> The changes are responsible for the characteristic deformities of rickets. Another feature of rickets is hypotonia, which may be manifested clinically by a protuberant abdomen and a delay in learning to walk. The level of phosphorus in the blood serum is usually reduced in active rickets—from the normal level of about 5 mg per 100 cc to 3.5 mg or less. The serum calcium may also be reduced below the normal level (10 mg per 100 cc.), and in such cases tetany is frequent. In adult women vitamin D deficiency may result in osteomalacia,<sup>22</sup> particularly at the time of pregnancy.

Other factors besides the dietary intake of vitamin D may influence the retention of calcium and phosphorus.<sup>21</sup> Not only must the diet contain

adequate amounts of these elements, but there should be a proper balance between the amounts of each ingested. This may become important if the diet is restricted to certain foods and does not include milk. (Milk is a good source of calcium and phosphate in balanced amounts.) It is also important that the phosphates in the diet should be in a form that is readily absorbed, which is probably not the case when cereals are the main source of phosphates.<sup>23</sup> An acid-ash diet—rich in meat and cereals, poor in fruit and vegetables—may increase the loss of calcium in the urine. Finally the absence of sunlight prevents the activation of provitamin in the body and increases the need for active vitamin D in the diet.

**Sources** It is a remarkable fact that most articles of human diet are poor in active vitamin D. The best sources are milk, butter, liver and eggs. A pint of summer milk ordinarily contains about 10 units,\* a pat of butter (10 gm) about 8 units, and one egg 20 to 60 units.<sup>24</sup> For therapeutic purposes very much richer sources of the vitamin are required. A great number of preparations containing concentrated vitamin D are now obtainable. Only the better known preparations will be mentioned here, but others may be used in appropriate doses. Cod-liver oil usually contains about 400 units per teaspoonful. It has the following advantages: it is cheap and safe, its fat content has nutritive value, and it may be more effective unit for unit than viosterol. Disadvantages are its fishy taste and the danger of lipoid pneumonia if it is vomited and inhaled. If cod-liver oil is not tolerated by the patient a more concentrated preparation may be used, such as tuna oil or viosterol in oil (preferably in oil which also contains vitamin A). Viosterol is obtained by ultraviolet irradiation of ergosterol derived from yeast. It is sold in concentrated oily solution, of which one drop contains 166 units.

Another way of giving additional vitamin D is in vitamin D milk. Three kinds are obtainable. Irradiated milk is standardized to contain 135 units per quart. Metabolized milk (obtained from cows fed with irradiated yeast) and fortified milk (milk to which vitamin D has been added) both contain 400 units per quart.

**Requirements** The amount of vitamin D required by infants is probably variable, but in general it can be said that about 400 units a day are necessary to ensure against the onset of rickets and to promote optimum skeletal growth and dentition.<sup>25</sup> It is clearly impossible for an infant to obtain this amount from milk alone, and for this

Since calciferol, vitamin D<sub>2</sub>, and other known members of the vitamin D group have apparently identical biologic properties, it is possible for practical purposes to consider vitamin D as a single entity.

\*Vitamin D activity is measured in international (U.S.P.) units. One unit corresponds to the activity of 0.025 micrograms of pure crystalline vitamin D.

reason all infants should be provided with some additional source of the vitamin. There are many different ways of making this provision. One procedure is to start in the first few weeks of life with  $\frac{1}{2}$  teaspoonful (2 cc) of cod-liver oil (200 units of vitamin D) daily, and to increase this after some days to 1 or even 2 teaspoonfuls (4 or 8 cc, 400 or 800 units) a day. This daily dose should be maintained for the first two years at least, and preferably longer.<sup>24</sup> The need for the vitamin may be less in summer, but it is unwise to break the habit of taking the oil regularly when once it is well established. Premature infants require more vitamin D than full-term infants and should receive at least 800 units a day, preferably in some more concentrated preparation than cod-liver oil.

Little is known about the vitamin D requirements in childhood and adolescence, but a teaspoonful of cod-liver oil a day might reduce the incidence of dental caries, and promote optimum growth in children who are rarely exposed to the sun or whose diet lacks abundance of milk and butter.

Nothing is known about the vitamin D requirements of adults. It has been suggested that additional vitamin may be beneficial in the following types of cases: people kept from the sunlight for long periods, particularly bed-ridden invalids in whom the bones are becoming rarefied, patients recovering from fractures, and individuals with a poor dietary history, particularly if no milk—the main dietary source of calcium—has been taken.<sup>24</sup> Pregnant women should receive at least 800 units a day throughout pregnancy, together with a liberal supply of milk.

**Therapy.** In the treatment of rickets a good procedure is to start with three teaspoonfuls (12 cc) of cod-liver oil (1200 units of vitamin D) daily, and to increase the dose if no improvement is evident after one month.<sup>24</sup> X-rays are useful in demonstrating the effect of treatment on bone formation at the growing points. Refractory cases of rickets that require relatively enormous doses<sup>25</sup> are occasionally encountered. In treating such cases care must be taken to avoid overdosage, which results in gastrointestinal symptoms and supranormal levels of calcium in the blood. Metastatic calcification may occur in the arteries and elsewhere, with serious consequences.

Vitamin D therapy has been recommended in a variety of conditions apparently unrelated to vitamin D deficiency. More work appears to be needed before these recommendations can be generally accepted.

Finally it should be emphasized that an ade-

quate intake of vitamin D is not alone sufficient to ensure normal retention of calcium and phosphorus. The diet must also contain an adequate supply of these elements, and this is most easily provided by the regular consumption of milk or cheese.

#### VITAMIN E

The vitamin E activity of biologic materials is due to a group of chemical substances known as tocopherols. They are found in vegetable oils, particularly in wheat-germ oil. Vitamin E deficiency in rats results in sterility in the male, and resorption of the fetus in the female.<sup>27</sup> Nothing is known about the human requirements for vitamin E. There have been some reports suggesting that wheat-germ oil may be useful in the treatment of habitual abortion.<sup>28</sup>

#### VITAMIN K

Vitamin K is a fat-soluble substance found in a variety of foods. The best-known sources are alfalfa and decayed fish meal. Fowls deficient in this vitamin develop hemorrhages, which are probably due to a lack of prothrombin in the blood. Human cases of obstructive jaundice with a bleeding tendency may show an abnormally long prothrombin clotting time.<sup>29</sup> It has been recently suggested that this is due to failure to absorb vitamin K, in the absence of bile secretion. This hypothesis is supported by the observation that vitamin K taken with bile salts by mouth may improve the prothrombin clotting time in some cases of obstructive jaundice<sup>30</sup> and that vitamin K has been found to have the same effect in a few cases when given by intramuscular injection.<sup>31</sup>

#### CONCLUSIONS

An ample diet, well supplied with dairy products, provides sufficient fat-soluble vitamins for the needs of the normal individual, except during infancy, pregnancy and lactation. Deficiency of fat-soluble vitamins is liable to arise when the diet is restricted, particularly in infants and children who do not receive enough milk. Fish-liver oils correct such deficiencies but do not compensate for the lack of other essential dietary constituents supplied by milk.

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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25021

#### PRESENTATION OF CASE

A seventy-seven-year-old, white, married man entered complaining of paroxysmal dyspnea, disorientation and generalized fibrillary muscle twitchings of four days' duration.

Approximately five years before entry the patient was admitted for a right inguinal hernia, constipation and a trace of glycosuria found in only one specimen. He drank rather large amounts of water and had nocturia several times each night. Walking caused his legs to ache. The previous year he had had sudden pain and swelling in the left foot. It remained colder than the other, with occasional slight swelling. His arteries were palpable and tortuous, his extremities cold and cyanotic. Examination of the heart at that time showed a rate of 48, with frequent dropped beats. There seemed to be slight enlargement to the left. No murmurs were heard.  $A_2$  was louder than  $P_2$ . The heart sounds were of good quality. The blood pressure was 130 systolic, 80 diastolic. The lungs were clear. Simple therapeutic measures gave marked relief of most of his symptoms, and he was discharged.

Six weeks before entry he had had an attack of precordial pain and accompanying symptoms which his physician thought were due to coronary occlusion, but a series of electrocardiograms did not substantiate such a diagnosis. It was therefore decided that there was coronary sclerosis, probably without definite occlusion. Pulmonary rales appeared shortly thereafter, and there was questionable ankle edema. Digitalization gave relief, and there was definite improvement although the patient failed to regain his previous state of health. About four days before entry he developed Cheyne-Stokes type of respiration, apparent air hunger with paroxysmal dyspnea, disorientation and generalized muscle twitchings. He had lost 25 pounds in weight during the past year. There were occasional twinges of precordial pain. Extrasystoles had been noted from time to time.

Physical examination on entry showed a disoriented, moderately ill man with Cheyne-Stokes breathing. The skin and mucous membranes

were dry but not discolored. The pupils were equal but reacted sluggishly to light. There was 3 to 4 cm of dullness at the right base, and diminished breath sounds. Crackling rales were heard over both right and left lower lung fields. The heart rate was 100 and regular except for ventricular premature beats. There was a suggestion of early gallop, the sounds being of poor quality. No murmurs were heard.  $P_2$  was greater than  $A_2$ . The left border was 12 cm to the left of the midline. The blood pressure was 130 systolic, 100 diastolic. Examination of the abdomen was negative except for an easily reducible right inguinal hernia. Knee jerks and ankle jerks could not be obtained. There was no clonus. Babinski signs were equivocal. Numerous muscular twitchings were noted over the entire body, but no weakness or sensory impairment was elicited.

The temperature was 96.8°F., the pulse 100, the respirations 40.

Examination of the urine showed a specific gravity of 1.033, a slight trace of albumin, a rare red cell and 8 white cells per high-power field, no sugar and no diacetic acid. The blood showed a red-cell count of 4,640,000, 80 per cent hemoglobin, and a white-cell count of 13,200 with 86 per cent polymorphonuclears. The nonprotein nitrogen of the blood serum was 39 mg per cent.

An x-ray film of the chest showed soft mottled dullness throughout the lower third of each lung field. On the left the shadow was most dense near the hilus, on the right at the extreme base. The heart shadow was indistinctly seen through the dull area and appeared to be only slightly enlarged. The apices were clear.

An electrocardiogram showed that  $T_1$  and  $T_2$  had become low compared with the record taken six weeks before entry.  $T_4$  had changed in contour. The changes were in the direction of normal, although the T waves remained abnormal. The P-R interval was 0.18 second. The ventricular rate was 100, the auricular rate 100.

On the day after admission the patient's condition was worse. There was slight cyanosis of the lips and nails. The pulse rate was 110 to 120. Respirations were of a more accentuated Cheyne-Stokes character. However, he seemed less irrational. On the third hospital day neurological examination showed a suggestion of spasticity in the left leg, with occasional doubtfully positive Babinski and Chaddock signs. There was left facial weakness, and slight drooping of the left eye. The patient was incontinent. He muttered half-formed words and did not recognize the examiner. The following day he was still delirious but complained of an intermittent mildly irri-

tating discomfort in the left anterior chest, which was aggravated by breathing. He had an abortive coughing grunt in paroxysms at long intervals, but no expectoration. Physical examination was unchanged except that the left facial weakness was more marked, the leg signs had disappeared and the patient was rational for a few minutes.

On the fifth day he was up in a wheel chair. In the late afternoon he had occasional chilly sensations lasting about twenty minutes, followed by profuse sweating, but his temperature remained at 98°F. His pulse was 120, the blood pressure 100 systolic, 65 diastolic. On the sixth day the facial paresis had disappeared. His general motility had improved bilaterally but there seemed to be less motion on the left. There was otherwise no change. On the ninth hospital day he was still confused. He had some difficulty in swallowing orange juice. Twitchings were still noted in the face, tongue and extremities. The heart was regular, with a rate of 108, gallop rhythm and sounds of poor quality. Rales remained at both bases. The left face was slightly weaker than the right. On the eleventh day rales were heard in the left back and axilla, with a few at the right base. The serum nonprotein nitrogen was 31 mg per cent, the red-blood-cell count 4,800,000, the white-blood-cell count 14,100, and the temperature 96°F. On the fourteenth day he was sitting in a chair without apparent shortness of breath and without Cheyne-Stokes respiration. He had received aminophyllin for four days, and his output of urine had increased. An electrocardiogram showed lower T waves than in the previous records apparently indicating increased myocardial damage.

There was marked Cheyne-Stokes breathing on the seventeenth day. The pulse was 130 to 140. A chest plate still showed mottled dullness in both lower lung fields, with no appreciable change since the last film. On the twentieth day there was slight edema of the back, and many rales in the left back and axilla. His condition seemed somewhat worse. The heart sounds were faint at a rate of 96 but fairly regular. His blood pressure could not be determined accurately, the systolic pressure was 95 to 100, the diastolic indefinite. The following day he showed a leaden pallor and was obviously running a downhill course. His urine output was decreasing, and edema increasing. The serum nonprotein-nitrogen was 109 mg per cent. He continued to complain of pain in the left chest and could not lie on that side. The left arm was more swollen than the right. He became gradually weaker but passed a peaceful night. The

following morning he gave a single gasp and died.

#### DIFFERENTIAL DIAGNOSIS

DR HOWARD B SPRAGUE At first this case seems fairly straightforward, but there are a few factors that do not seem to fit into the diagnosis suggested by the history. His first admission can be summarized by saying that at the age of seventy-two he was examined and showed evidence of general arteriosclerosis, perhaps with a mild sclerotic diabetes. He had a history suggesting an occlusive episode in an artery of the foot. When they say his heart had a rate of 48 with frequent dropped beats, I suppose they refer to what was felt at the wrist rather than at the apex of the heart. He probably had premature beats that did not reach the wrist rather than heart block, because five years later, at the age of seventy-seven, he did not show heart block. His heart otherwise did not seem to be particularly involved, being only slightly enlarged, and he had a normal blood pressure, no heart murmurs and a good quality of heart sounds. Then we know nothing about him until six weeks before he entered the hospital, when he had an attack of precordial pain, from which he apparently never recovered to any appreciable extent, and developed a picture of congestive heart failure.

Precordial pain is not the type of pain that is ordinarily described in coronary occlusion although I have seen it with a proved diagnosis of occlusion. If he did not have a coronary attack at that time we have to think of pain of pericardial disease or pleural disease or some other pulmonary or mediastinal pain. We have no pleural or pericardial rub described. There is nothing to suggest that he had a dissecting aneurysm, either on physical examination or by x-ray, and in the absence of hypertension, that would seem to be unlikely. The findings then are congestive failure, with the congestion localized in the bases of his lungs.

Paroxysmal dyspnea and Cheyne-Stokes breathing are commonly seen in arteriosclerotic individuals with cardiac failure. He had lost 25 pounds in weight. Can we ascribe that to the arteriosclerosis, which often does result in loss of weight, or should we think of cancer? The heart examination on his second visit showed an increase in size, murmurs were still absent but there was a change in the heart sounds as they were of poor quality and there was a suggestion of gallop rhythm. The blood pressure had not been disturbed unless he had had some hypertension in the interim. The neurologic signs and generalized muscular twitchings do not mean very much to me. At his age, I

believe that very ill individuals can have general fibrillary twitchings over the entire body without its meaning a primary neuromuscular condition. His urinary examination at that time does not suggest that he had much impairment of function on a primary nephritic basis but a certain amount secondary to congestive heart failure.

DR. AUBREY O. HAMPTON: I am going to add the postmortem films in this case because they are of better quality. The first portable examination of the chest showed a relatively dense left midlung field and an obscured left side of the diaphragm, with a clear space between the lower and middle shadows. On the right side a rather dense shadow which runs irregularly downward along the heart shadow is seen, and this is fairly sharp in lateral outline. You do not see the diaphragm on either side. The heart is moderately enlarged in spite of the fact that this is a portable film. At the second examination the pulmonary conus, if that is it, is prominent, but the density in the lungs has changed very little. In the postmortem films the chest appears much clearer than in the antemortem ones. The disease that we might have suspected in the upper lobes is not certain, and all we see is homogeneous density at the right base and an indefinite, ill-defined, rather oval shadow on the left side, which is flat against the posterior chest wall at about the sixth rib. It looks quite a bit like encapsulated fluid, or even tumor can have this appearance. It is very sharp in outline in the lateral view, and it suggests an infarct because of this. The shadow here in the lateral view is along the superior margin of the lower lobe, and you cannot tell from this other view which lobe it is in.

DR. SPRAGUE: It looks from the x-ray films as if this man had died cured. To proceed he ran a downhill course with some changes in the electrocardiogram which were not specific and with neurological signs which were variable and seemed to indicate minor occlusive episodes in the cerebral circulation. The cardiac findings on physical examination were those of falling blood pressure, the poor quality of the heart sounds increasing and gallop rhythm persisting. At the end his non-protein nitrogen was increased to 109 mg per cent, which I believe could be accounted for on the basis of congestive failure. He died rather suddenly.

The joker in the situation seems to be the pulmonary lesion. We must admit, I think, a generalized arteriosclerosis, and with changes in the T waves in the electrocardiogram, we cannot disregard the probability of coronary disease, perhaps of multiple coronary occlusion or a generalized process, without evidence of an acute large in-

farct. Are the changes in the lungs those of congestive heart failure which has been relieved, or are they those of multiple pulmonary infarction or cancer? The lack of progression of this picture is not in favor of cancer but of something which was remediable, and the best guess to my mind is pulmonary infarction, perhaps with some pleuritic response and accumulation of fluid. If these are pulmonary infarcts, it is not necessary to assume that they came from the heart because they may have come from the peripheral venous circulation. My diagnosis is generalized arteriosclerosis including cerebral and coronary sclerosis, with multiple small cardiac infarcts and pulmonary infarcts.

DR. JAMES H. MEANS: I saw this patient over a period of years in my office, and then I saw him in consultation with his local physician at the time of his last illness and cared for him in the hospital. There are a number of points I should like to mention. Dr. Sprague asked about the heart condition back in 1933. I do not know to what that 42 rate was due, or from where that note came. The chart showed a rate of about 60, and the electrocardiogram taken in 1933 reads "Normal rhythm, heart rate of 65, P, Q, R, S and T waves normal in all leads, a tendency to very slight left-axis deviation, well within normal limits. Lead 3 was the unstable lead and varied some with respiration."

During the last illness there were several features which are worth going over. He had about as troublesome Cheyne-Stokes breathing as I have seen. That was the cause of his distress. He would sleep during the apnea and have bad dreams, and then would wake up in terror. Dr. Cobb saw him with me. He might comment on that part of it.

Dr. Sprague has considered the possibility of some unsuspected lesion. So did we. We thought of cancer on account of the weight loss but could not find any evidence and finally concluded he did not have it.

The findings in the left chest are worthy of comment. For the few days before he died he had pain on breathing and I examined the chest carefully. He had an x-ray examination shortly before death which was not very helpful, but I did wonder if he had some queer lesion in the left chest. I did not have the faintest idea what it was, because I could not find any physical signs, but it turned out that there was something peculiar there that we shall hear about later. He also had some swelling of the left arm. The pain in the left chest and arm made one wonder what was going on in the left chest or mediastinum. Of course Dr. Sprague has had the advantage of

postmortem x-ray films which I did not have when I made the following note the day he died I predicted "The pathologist will find a heart only slightly enlarged, if at all, with narrow coronaries and old infarcts. Some degree of fibromyocarditis and general arteriosclerosis will be present and in the main I expect there will be found extensive arteriosclerosis with thrombosis and softening in some silent area of the brain. Slight general anasarca will be present. There will probably be hypostatic pneumonia, not very marked, at each base. I am aware of no other lesion." The mental picture made me think there must be a lesion in the brain, which I presumed was sclerotic in origin.

DR STANLEY COBB I agree absolutely with Dr Means's diagnosis. I might add about the brain that you may often have symptoms like these and at autopsy not have any recognizable lesion in gross, there are hardening of the arteries and areas of relative ischemia, but no areas of softening. On microscopic examination you ought to find a loss or abnormality of the nerve cells in some localized area. That should explain everything except his rather marked muscular twitchings. They were unusual in lasting for a long time. I do not know of anything that explains them satisfactorily, and I suppose we must fall back on the theory of relative ischemia of the brain for a long while, because of the hardening of the arteries.

#### CLINICAL DIAGNOSES

Cardiac infarction, old  
Arteriosclerosis  
Cerebral thrombosis, with softening  
Hypostatic pneumonia

#### DR SPRAGUE'S DIAGNOSES

Arteriosclerotic heart disease, with congestive failure  
Coronary occlusion (probably multiple)  
Multiple pulmonary infarcts  
Minor occlusions of cerebral vessels

#### ANATOMICAL DIAGNOSES

Arteriosclerosis, marked, coronary, cerebral and aortic  
Coronary thrombosis, old and recent  
Aneurysms, arteriosclerotic, right coronary and left internal iliac arteries  
Infarct of heart  
Hypertrophy of heart.  
Pulmonary embolism, with pulmonary infarction  
Bullous emphysema, left lower lobe  
Diffuse cerebral atrophy

#### PATHOLOGICAL DISCUSSION

DR TRACY B. MALLORY This man showed a very extensive and diffuse arteriosclerosis. His heart was very much enlarged, weighing 650 gm. It showed severe coronary sclerosis affecting all branches, with two thrombi, a fairly fresh one in the left circumflex artery and an older one in the main right coronary artery. The latter artery was quite unusual in that it showed a fusiform aneurysm 1.2 cm in diameter and 1.5 cm in length which was completely filled with a partially organized thrombus. There was a large area of infarction at the apex and a still unorganized overlying thrombus, which was consistent with a duration of six weeks as suggested by the history. The left auricle contained a mural thrombus which might well have been the source of peripheral emboli but was not, so far as we could discover. The episode of circulatory difficulty in his toe, going back to the earlier admission, was probably explained by an aneurysm of the iliac artery which contained a thrombus, and I imagine that at some earlier period a small embolus broke off from this and was swept down to a small vessel of the foot. The lungs proved interesting. They showed complete infarction of both lower lobes, and on the left the picture was complicated by the fact that there was a huge emphysematous sac which overlaid the infarct. It must have made considerable difference in the physical signs over that area and also served to confuse the x-ray picture. There were multiple pulmonary emboli to correspond with the areas of infarction. The brain showed a severe, rather diffuse arteriosclerosis, with evidence of diffuse atrophy. Perhaps Dr. Kubik will tell us more.

DR CHARLES S. KUBIK The ventricles were twice the normal size, and the convolutions showed atrophy. There was no infarction that one could see with the naked eye.

DR MEANS Just what was the brain lesion?

DR MALLORY A diffuse cerebral atrophy, which I should think was without much question based on severe arteriosclerosis.

DR MEANS Is that the sort of thing that precedes or takes the place of softening?

DR MALLORY The latter I think. Most of the cases in which we have seen such a picture have had pretty diffuse cerebral sclerosis, have they not, Dr. Kubik?

DR KUBIK Yes, one is likely to find numerous small infarcts with the microscope and sometimes can see them with the naked eye. I do not believe there was anything one could see with the naked eye in this case, however.

DR MEANS In regard to the size of the heart, I could not make out any great enlargement on



physical examination and was influenced by the statement of the radiologist that the heart shadow was indistinctly seen through the dull area and appeared to be only slightly enlarged. The patient was too sick for a seven-foot film.

## CASE 25022

### PRESENTATION OF CASE

A seventy-seven-year-old, white, Canadian night watchman entered the hospital with the complaint of vomiting and hematemesis of four weeks' duration.

Seven years before entry he had had a "heart attack" characterized by breathlessness and generalized edema. He remained in bed for three weeks and two weeks later returned to work. He was given digitalis for the first month. He continued to be somewhat dyspneic but was able to work until two years before entry, when he fell, striking his right chest. He stayed in bed for two days but was unable to return to work because of dyspnea and ankle edema. His physician put him on a regime of restricted activity, with digitalis and Salyrgan medication, and he remained fairly well until six months before entry. At that time he suddenly developed pain in the left eye and soon was unable to see with it. For several years the vision in his right eye had been rather dim. Four weeks before entry he had had two episodes of vomiting. The vomitus contained gross blood. However, his appetite and digestion appeared to be unimpaired. Three weeks before entry he had again vomited clots of blood, and this was repeated one week later. During the two weeks before entry his appetite was poor, and his bowel movements were not so regular as they had been previously. During the recent period of his illness he had become pale and had shown some mental disorientation and loss of memory. On two occasions about seven months before entry he had had very severe nosebleeds.

His past history and family history were essentially negative. He had traveled all over the world as a seaman until he was thirty years old. He denied taking any alcohol.

Physical examination revealed a very pale, somewhat dyspneic, emaciated old man, lying flat in bed in no great discomfort. The veins of the neck were distended, and the left eyelid drooped. The lungs showed coarse moist rales at both bases. The heart was very much enlarged to the left, with a harsh systolic murmur heard loudest at the aortic area. The blood pressure was 140 systolic, 90 diastolic, and the pulse had an alternating quality. The liver was enlarged and somewhat tender. The abdomen was

slightly tender throughout, but no masses were felt. The rectal examination was negative. There was pitting edema of the lower legs and feet, and the genitalia were somewhat edematous.

The temperature was 97°F, the pulse 75. The respirations were 20.

The urine had a specific gravity of 1.018 and contained a trace of albumin and occasional casts. The blood showed a red-cell count of 1,200,000 with 22 per cent hemoglobin, and a white-cell count of 11,000 with 78 per cent polymorphonuclears. The guaiac test on the stool was 2+. The nonprotein nitrogen of the blood was 117 mg per cent.

On the second day a transfusion was given, but after 400 cc of blood had been injected the patient began to cough and developed rales in the upper lung fields. He recovered from this and his condition remained about the same until the fourth day when, after exerting himself to sit up, he suddenly fell back, gasped a few times and died.

### DIFFERENTIAL DIAGNOSIS

DR. RICHARD J. CLARK. We are confronted with an elderly man in the degenerative-disease age group. He had had a history of cardiovascular disease of seven years' duration, apparently with acute congestive heart failure seven years before death. This was followed by temporary improvement and then recurrence of failure, which was slowly progressive, with limitation of activity.

Six months before entry he developed sudden pain in the left eye followed by failure of vision. There is little to indicate just what occurred. It might have been acute glaucoma but more likely was an acute vascular accident, such as an embolus in the central artery or a venous thrombosis.

Four weeks prior to entry we have the onset of his terminal situation of vomiting and hematemesis. The vomitus contained large amounts of blood and clots. With the onset there was no story of nausea, abdominal pain or indigestion. The vomiting was spontaneous and seemed dependent on blood in the stomach. There is no other history of a bleeding diathesis, except for two severe nosebleeds seven months before which may well have resulted from hypertension.

On examination there was evidence of cardiac enlargement and failure. The blood pressure was relatively normal, but we may well assume that it was considerably elevated prior to his cardiac failure and repeated hemorrhages. His liver was enlarged and slightly tender. Apparently no spleen was felt.

The urine showed a good concentration, but

his nonprotein nitrogen was 117 mg per cent. This may represent, in part at least, an extrarenal azotemia dependent on cardiac failure, blood and electrolyte loss and possibly liver disease. There was a profound anemia. We are told nothing about the blood smear, platelets or bleeding time, which helps us little toward a possible diagnosis of primary blood dyscrasia. Therefore we may reasonably assume that this was a severe secondary anemia.

Following transfusion the patient apparently developed acute pulmonary edema. His exodus was probably cardiac, although the possibility of a pulmonary embolus must be entertained.

The chief problem here is that of the cause of the hematemesis. This was gross acute bleeding. It might have come from a gastric or duodenal ulcer, but such repeated bleeding would seem unlikely in the complete absence of other symptoms of such a disorder. With cancer of the stomach the bleeding is more likely to be an oozing, with coffee-grounds vomitus. Acute gastritis should give other symptoms and bleeding in smaller amounts. There is no evidence for a primary blood dyscrasia. Such a massive degree of bleeding from a chronic Bright's disease would be unusual. In an old man with chronic vascular disease the possibility of an aneurysm's rupturing into the esophagus might be considered, but we should expect one profuse fatal hemorrhage with this condition. Why are we told of the blow to the right chest? Could he have developed a traumatic diaphragmatic hernia, with bleeding resulting from this? There are no other symptoms that point in this direction, and I believe such a diagnosis is unlikely.

The most probable cause of this bleeding is from esophageal varices dependent on a portal cirrhosis of the liver. The type of bleeding and the patient's general state fit with this. We should like to have had an alcoholic history, a description of dilated abdominal veins and possibly an enlarged spleen. There was no ascites or jaundice, but this need not deter us from the diagnosis. I may be wrong, the enlarged liver may be one of chronic passive congestion, and the bleeding may depend on passive congestion, with bleeding from an abnormal plexus of veins. However, lacking any x-ray or further data, I shall make a diagnosis of cirrhosis, with esophageal varices.

I believe a very much hypertrophied heart of the hypertensive type with coronary sclerosis will be found. Because of the harsh systolic murmur in the aortic area, calcification of the aortic valve is to be suspected, or possibly marked dilatation of the aorta. There will be acute and chronic pas-

sive congestion, together with generalized arterio sclerosis and also nephrosclerosis.

#### CLINICAL DIAGNOSES

Hypertensive and coronary heart disease with congestive failure  
Chronic vascular nephritis with uremia  
Hematemesis, etiology undetermined  
Secondary anemia  
Generalized arteriosclerosis

#### DR CLARK'S DIAGNOSES

Hypertensive heart disease, with cardiac hypertrophy  
Coronary sclerosis  
Calcification of aortic valve?  
Congestive failure, acute and chronic  
Generalized arteriosclerosis  
Nephrosclerosis  
Portal cirrhosis  
Esophageal varices

#### ANATOMICAL DIAGNOSES

Cardiac hypertrophy, hypertensive type  
Calcification of cusps of aortic valve, slight  
Arteriosclerosis, generalized  
Nephritis, chronic vascular, marked  
Hydrothorax, bilateral  
Chronic passive congestion

#### PATHOLOGICAL DISCUSSION

DR TRACY B. MALLORY. This is the type of case that is apt to be a little disappointing, but I think is, nevertheless, worthwhile presenting every once in a while. All Dr Clark's predictions are correct except as regards the cirrhosis of the liver and the cause of the hematemesis. Absolutely nothing was found to explain the latter. We see on the average, one case a year of very severe hematemesis for which we are unable to find a cause. What the explanation of such cases is, I have no idea. It is not inconceivable, I suppose, for a man to have a nosebleed in his sleep and wake up and vomit blood.

He did have a very big heart, weighing 700 gm. He had some calcification of the aortic cusps. There was no real aortic stenosis, however. There was a point omitted in the physical examination that should have been recorded. The aortic second sound was louder than the pulmonic and not diminished as it probably would have been with true aortic stenosis. The lungs showed passive congestion. The kidneys showed rather marked nephrosclerosis and also a very severe cystic degeneration of the type that we see in elderly people—an entirely different type of cyst from that of the congenital polycystic kidney. In these older

people it is easy to prove that the cysts develop from glomerular capsules, presumably because of a blocked tubule. Bowman's capsule gradually dilates, the glomerulus shrinks to smaller and smaller proportions and finally disappears entirely. In the congenital polycystic kidney, the cysts have nothing to do with Bowman's capsule, and their origin is entirely unknown.

DR ALLEN G BRAILEY: Was it an anginal death?

DR MALLORY: He had very good coronary arteries and we cannot assume that it was an anginal death.

DR JOHN D STEWART: How large was the liver?

DR MALLORY: Moderately enlarged, due entirely to chronic passive congestion.

DR JOHN W ZELLER: What was the cause of death?

DR MALLORY: I should say cardiac decompensation and uremia. Why it was sudden, I am not sure, but in a man with chronic nephritis of this type a nonprotein nitrogen of 80 mg per cent is in the uremic level.

DR RICHARD CHUTE: The anemia was secondary to the vomiting of so much blood rather than secondary to the renal condition?

DR MALLORY: It could have been due to either

I have no way of distinguishing. Probably the two were cumulative in their effect.

A PHYSICIAN: Was there any antemortem diagnosis of the eye condition?

DR MALLORY: There is no note. He was in the hospital a short period, and no eye consultant had seen him. We did not have permission to examine it postmortem.

DR BERNARD JACOBSON: Was the bone marrow normal?

DR MALLORY: No, it was hyperplastic so far as the vertebrae were concerned.

DR JACOBSON: It was not suggestive of pernicious anemia?

DR MALLORY: Not in the slightest respect.

DR THORNTON SCOTT: What kind of heart disease did he have?

DR MALLORY: Straight hypertensive heart disease, I should imagine. The kidneys certainly connote hypertension. Clinically we have nothing except a slightly elevated diastolic pressure on the final entry to give evidence, but it is very common in hypertensive disease to have the blood pressure fall terminally.

DR WYMAN RICHARDSON: A blood pressure of 140 systolic, 90 diastolic, is quite high for a man with a red-count of 1,200,000. It is almost hypertension in itself.

DR MALLORY: Yes.

# The New England Journal of Medicine

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## THE LICENSING OF HOSPITALS

THERE is a widespread conviction that the relation between physician and patient is of such an intimate and personal character that complete governmental control of the practice of medicine is chimerical. But there recurs constantly the question of whether less than complete control should be extended in some specific field of medicine. It is difficult to establish a general principle and to apply it wisely, so that before attempting to solve the problem for any limited field one should endeavor to discover the facts of practice in that field, the abuses, if they exist, the harm resulting and, finally, the remedy or remedies. Comparison with other fields and analogous problems should be made.

The abuses possible in uncontrolled hospitals for patients needing the care of a psychiatrist are too well known to demand a reopening of the question of whether such institutions should be

licensed. In Massachusetts, they have all been placed under the Department of Mental Health, even though they are privately owned.

The need for the protection of women during childbirth has been recognized formally to the extent of requiring a license from the Massachusetts Department of Public Welfare for an institution which cares for such patients. Infants and children can no longer be "farmed out" as formerly, and the Commonwealth carefully supervises certain aspects of the care of these wards.

In the case of surgery, however, there is almost no supervision other than that the hospital building must meet the regulations of the local fire department. The most serious defect is that any physician licensed by the Board of Registration in Medicine may practice surgery. The candidate may be a psychiatrist of thirty years' practice, who has never seen an operation since he left the medical school. Or he may be a neophyte, just graduated from medical school, who has never actually participated in an operation and who failed miserably in the examination in surgery given by the Board, but whose general average was at the passing level. Both alike are free to operate if they see fit.

What may such a physician do? He may rent a small dwelling house for a hospital, employ a nurse, registered or unregistered, who will be superintendent, head nurse in the operating room and first assistant at all operations, another nurse, registered or unregistered, who will be night supervisor and extra nurse in the operating room, and a general-duty domestic servant, who will also cook. The surgeon may use some non-inhalation form of anesthesia and then perform abdominal operations, such as removal of the appendix, without the assistance of another physician. He may make, or fail to make, such records as he sees fit. He may falsify records and diagnoses and causes of death. He may have a showy array of therapeutic and laboratory apparatus and he may go through the gestures of making applications and examinations and writing down suitable results, which are impressively gone over with the patient's family, especially if death ensues, as indicating that everything humanly possible was done. If by chance

the physician is a clever operator, a clever salesman and a clever rascal who knows how to cover his tracks, what is the likelihood of his being discovered?

If by chance the physician is an abortionist who keeps careful and minutely detailed falsified records of examinations which indicate that the patient was not pregnant, even to a negative Aschheim-Zondek test and a notation that the doctor told the patient that she was not pregnant, and if the patient leaves the hospital in five or six days, satisfied, is there any likelihood of detection?

If the surgeon operates without consultation, never benefiting by the opinion of a pathologist, destroying without record or with falsified record, all tissue removed at operation, he may perform an enormous number of unnecessary operations and do untold harm. Thus, the unscrupulous and clever surgeon constitutes one of the most serious menaces in the care of the sick. Conscience and fiduciary responsibility are for him non-existent.

There arises also the question of whether all hospitals should be licensed, not merely those in which surgical operations are performed. Practically, the separation of hospitals into two such groups is impossible. Surgery should be regarded merely as one method of therapy. Pneumonia or typhoid fever or any one of a number of other medical diseases may develop complications demanding surgical treatment. To attempt to move the patient to another hospital might prove fatal and certainly would be dangerous.

For the improvement of medical care all hospitals should be licensed and all surgery should be checked in such a way that it is a matter of record that a definite diagnosis was made, that treatment was carried out by competent persons under reasonably satisfactory conditions for good surgery, that certain conditions were found at operation and that all tissue removed was examined in the laboratory by a competent pathologist.

In all first-class hospitals these have been among the minimum requirements for years, and the public has no conception of how much benefit it has received from the standardization of hospitals which, under the auspices of private agencies, has

made such progress in the last quarter of a century. Now that private initiative has shown the way, public control by licensing of all hospitals may justly be required for the protection of the public. The members of the medical profession, who know not only the possibilities for abuse but also the actual abuses, should lead the way in advocating this necessary advance.

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## PHYSIOLOGICAL RESEARCH

THE lecture by Professor Meyerhof on the chemistry of the anaerobic recovery of muscle, which appears in this issue of the *Journal*, is an outstanding example of sustained and integrated physiological research. Its interest to the physician does not depend on a complete understanding of the complex chemical reactions that are discussed. What will appeal to the physician is the bird's-eye view of the nicety with which chemical and physical in vitro experiments have been correlated with the changes occurring in the physiologic processes of functioning tissue. The physician appreciates that the practical application of this knowledge to human subjects has already advanced our understanding of the physiology of exercise. He knows that the muscular dystrophies and diabetes mellitus involve deranged metabolism of creatine, phosphates, lactic acid and glucose. But the work reviewed by Professor Meyerhof shows that muscular metabolism not only involves these familiar compounds, but also depends on a whole new group of active intermediary products. These substances, which appear, split up and are resynthesized, are essential to muscular activity. Their discovery is as fundamental as that of the hormones or the vitamins. This new knowledge is particularly important to the physician, who continually attempts to comprehend and control various aspects of cellular activity in patients.

As the physician thinks of patients with perhaps a better understanding of these new factors he may see new ways of attacking clinical problems. Indeed, his clinical material may provide him with means of extending the knowledge of the physiologist that might never come to the latter's attention.

## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## PLACENTA ACCRETA

The patient was a thirty-eight-year-old primigravida, whose last menstrual period began April 14, 1937, and who was due to be confined January 21, 1938. When first seen, at seventeen weeks, her uterus was considerably larger than it should have been on the basis of her dates. Her pregnancy was uneventful until one week from term, when she had an elevation of blood pressure to 150 systolic, 100 diastolic, at which time her ankles were swollen and her urine showed a trace of albumin. Late in pregnancy a 5-cm uterine mass, probably a fibroid, was palpated to the left and below the umbilicus.

Although labor pains began January 23, she did not begin to show dilatation of the cervix until four days later. The next day the membranes ruptured spontaneously and twenty-four hours later an infant, weighing 8 pounds, 10 ounces, was delivered following a lateral episiotomy. The placenta failed to separate, and so the patient was returned to her room. There was no external bleeding or evidence of accumulation of blood in the uterus. The latter reached nearly to the right costal margin and revealed another 5-cm mass, this one attached to the fundus. After fourteen hours of failure of the placenta to separate, the patient was prepared for exploration of the uterus, a diagnosis of placenta accreta having been made. She was in good condition, with a blood pressure of 140 systolic, 84 diastolic, and a pulse of 96 to 124. Under nitrous oxide, oxygen and ether anesthesia the vulva and vagina were prepared with mercurochrome acetone and mercurochrome respectively. The hand was introduced into the fundus of the uterus, and numerous intramural fibroids were encountered. The placenta was definitely adherent and could not be removed without using more force than was justifiable. The patient was therefore prepared for laparotomy. A uterus which contained multiple fibroids was then removed supravaginally, leaving both tubes and ovaries.

Her postoperative course was complicated by a purulent vaginal discharge, beginning on the ninth

day, although this had largely subsided by the time she left the hospital. Her temperature ranged from 99 to 101°F up until the sixteenth day, and there was a moderate amount of postoperative abdominal distention. She was discharged well on the twenty-first postoperative day.

The pathological examination revealed a postpartum uterus with placenta attached, the whole specimen measuring 21 by 10 by 13 cm. There were many fibroid tumors distorting the specimen, the principal ones being as follows: a subserous one, 9 by 6 by 6 cm, at the right cornu, a subserous one, 3 by 3 by 1 cm, at the fundus, and an intramural one, 5 by 5 by 4 cm, within the left lateral wall. There were six other similar tumors, all smaller, scattered throughout the rest of the organ. The placenta measured 14 by 13 by 11 cm and was firmly adherent to the uterine wall by its margins and in portions of its fundal attachment. The myometrium at the fundus measured 12 mm in thickness, although there was a cornual sacculation (diverticulum) whose wall was only 3 mm thick. Gentle to firm traction on the placenta did not dislodge it.

The microscopical examination of numerous sections revealed the picture of partial placenta accreta, complicated by acute inflammation. The spongy decidua basalis was absent, but occasional small areas of fibrosed, compact decidua remained at the placental site. In general, however, the placental villi were attached directly to the myometrium, which showed fibrosis and a variable degree of acute and chronic inflammation. The placental tissue, which was of normal, mature type, showed infiltration by acute inflammatory cells. The amniotic and chorionic membranes were especially involved in this process, probably associated with premature rupture of the membranes together with retention in the uterus fourteen hours post partum. The decidua vera likewise was deficient in its spongy, glandular layer, while the compact portion was deficient and fibrosed and showed variable degrees of acute and chronic inflammation.

*Comment.* This case is of extreme interest because of the fact that it occurred in a primipara, there being only one other such patient in the literature. Furthermore, the association of a placenta accreta with fibroid tumors and a diverticulum is very rare.

## DEATHS

DAVIS—FREDERICK D. DAVIS, M.D., of 233 Forest Park Avenue, Springfield, died December 31. He was in his fifty-fifth year.

Born in Blandford he graduated from the Westfield

schools, attended Amherst College for one year and received his degree from the University of Vermont College of Medicine in 1910. After serving his internship at the Backus Hospital in Norwich, Connecticut, he returned to Westfield and practiced medicine for five or six years. Dr. Davis went to Springfield in 1917 and specialized in neurology although he did some general practice. In 1929 he was made a member of the Mercy Hospital staff in Springfield.

Dr. Davis held memberships in the American Medical Association and the Massachusetts Medical Society.

His widow, his mother and two daughters survive him.

**GREGG**—DONALD GREGG, M.D., of Wellesley, died January 6. He was in his sixtieth year.

Born in Hartford, Connecticut, he moved as a child to Colorado Springs, Colorado, attending the public schools there. He prepared for college at Cutler Academy, graduated from Harvard College in 1902 and received his degree from Harvard Medical School in 1907. He served his internship during 1908-1909 at the Massachusetts General Hospital, after which he served four years as resident physician of the Philippine General Hospital at Manila, Philippine Islands. During one year there he was assistant professor of tropical medicine at the University of the Philippines.

Dr. Gregg returned to the United States in 1912 and began practicing in Wellesley. He became associated with Dr. Channing in the direction of the Channing Sanitarium at Wellesley, taking full charge at the time of Dr. Channing's death in 1922.

Among his affiliations were memberships in the American Medical Association, Massachusetts Medical Society, American College of Physicians, American Neurological Association, American Psychiatric Association, New England Society of Psychiatry, Association for Research in Nervous and Mental Disease and American Psychopathological Association.

His widow, three brothers and three sisters survive him.

**MORGNER**—RICHARD A. MORGNER, M.D., of Main Street, Fitchburg, died December 27. He was in his sixty-sixth year.

After graduating from Clinton schools, he completed the course at Massachusetts College of Pharmacy, and then worked for two years as a druggist, that he might attend medical school. He received his degree from Tufts College Medical School in 1902. After internship at the Chelsea Marine Hospital and the Lynn Hospital, in 1904 he went to Fitchburg, where his record of deliveries won for him an award from Tufts College Medical School.

He was a member of the American Medical Association and the Massachusetts Medical Society and was also on the senior surgical staff at the Burbank Hospital.

His widow and two children survive him.

## MISCELLANY

### 'YOUR HEALTH' BROADCASTS

The next series of "Your Health" broadcasts, sponsored by the American Medical Association and the National Broadcasting Company and heard over the Blue Network each Wednesday at 2:00 p. m., is entitled "Dodging Contagious Diseases." It consists of four broadcasts, the last three of which are as follows:

January 18 Scarlet Fever, Measles and Whooping Cough

Modern attitudes toward these diseases, prevention by community co-operation.

January 25 Smallpox and Diphtheria

Unnecessary diseases, preventable by immunization of infants

February 1 Preventing Epidemics

Reporting of cases, quarantine and other control measures

## NOTES

The following appointments to the staffs of the Harvard Medical School and the Harvard School of Public Health have been recently announced: Thomas R. C. Fraser, as research fellow in medicine, D.P.M. London '37, Alfredo Lanari, of Buenos Aires, as research fellow in physiology, M.D. Buenos Aires '34, Eric K. Cruickshank, of Aberdeen, Scotland, as research fellow in surgery, M.B., Ch.B. Aberdeen University '37, Maximilian G. Verlot, of Ghent, Belgium, as research fellow in surgery, M.D. Ghent '35, Adolph Meltzer, of New York City, as assistant in surgery, M.D. Cornell '34, Maurice H. Greenhill, as research fellow in psychiatry, M.D. University of Chicago '36, Nathan Gorin, of Boston, as assistant in child hygiene, M.D. Boston University School of Medicine '17.

The following fourth year students in the Harvard Medical School have been elected to membership in the Harvard chapter of Alpha Omega Alpha: John Adams, Eben Alexander, Lemuel Bowden, Jerome Frank, Charles Jennings, Ferdinand McAllister, Max Michael, Arthur Pier, Frederick Ross, John Wilson and Lucius Wing.

On January 1, Dr. Joseph B. Howland retired as superintendent of the Peter Bent Brigham Hospital, having served in that capacity since May 1, 1919—or nearly twenty years. He was succeeded by Dr. Norbert A. Wilhelm, a former assistant superintendent and, for the past two years, superintendent of the Butterworth Hospital, Grand Rapids, Michigan. Dr. Wilhelm graduated from St. Louis University School of Medicine in 1925.

## CORRESPONDENCE

### THE GREATER LAWRENCE MEDICAL ASSOCIATION

*To the Editor*—On December 14, the Greater Lawrence Medical Association held its second annual dinner. The guest speaker was Dr. Morris Fishbein, of Chicago, editor of the *Journal of the American Medical Association* who spoke on "The National Health Program and American Medicine."

His talk was broadcast over two radio networks and I thought it would be of interest to the fellows of the Society to know the favorable reaction of the public to his remarks. Many messages of praise have come back to us, most of which say that the doctors have a case after all. In view of the constant and almost continuous deluge of propaganda against the physicians of this country in the daily press and the weekly and monthly periodicals, it must be indeed refreshing at times to hear the doctors' side of the story. I am fairly convinced that the medical profession has lagged in this respect and it is, therefore, pleasing to see that through the efforts of the Massachusetts Medical Society a series of articles is now ap-

pearing in the *Boston Evening Transcript* This is good work, and too much of it cannot be done.

Yesterday the Greater Lawrence Medical Association invited Congressman Laurence J Connery at a special meeting, which was attended by a large number of physicians We presented our case to him in detail, and he apparently was very much impressed by our story He said that, although many physicians had asked him to vote against socialized medicine, no group in his congressional district had up to this time taken the trouble to discuss the subject with him He told us that he hoped that other organizations would get together with their congressmen, because he was sure that on their return to Washington the opposition would canvass every member of Congress

N F DE CESARE, M.D., *President*  
Greater Lawrence Medical Association

Lawrence Massachusetts

## NOTICES

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, January 24, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance), at 8 15 p m

#### PROGRAM

Presentation of cases

Some Clinicoroentgenological Correlations Dr Merrill C Sosman and Dr Samuel A. Levine

Medical students and physicians are cordially invited to attend

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, January 19, in the amphitheater of the Peter Bent Brigham Hospital, Dr Samuel A Levine, assistant professor of medicine, Harvard Medical School and senior associate in medicine, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.

### CENTRAL MASSACHUSETTS ALUMNI CLUB OF BOSTON UNIVERSITY SCHOOL OF MEDICINE

A symposium sponsored by the Central Massachusetts Alumni Club of Boston University School of Medicine will be held in the Worcester State Hospital Chapel (Administrative Building), Belmont Street, Worcester, on Wednesday, January 18, at 8 00 p m.

The symposium The Recent Epidemic, in Human Beings, of Encephalomyelitis in Massachusetts A clinical, pathological and immunological study will be given by Dr Edward C Smith, Dr Charles F Branch and Dr LeRoy D Fothergill

Physicians medical students and nurses are cordially invited to attend

### NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The next meeting of the New England Society of Physical Medicine will be held at the Hotel Kenmore, Boston, on Wednesday evening, January 18 The Council will meet at 6 00, there will be an informal dinner at 6 30 in the Empire Room

#### PROGRAM

Organic Arterial Disease (with colored slides) Dr Edward A Edwards Discussion Dr Laurence B Ellis  
All members of the medical profession are cordially invited to attend.

WILLIAM D McFEE, M.D., *Secretary*

### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held in the Mallory Amphitheater, Boston City Hospital, Monday, January 23, at 8 15 p m.

#### PROGRAM

Clinicopathological Correlations Dr Soma Weiss  
Study of the Presystolic Murmur of Mitral Stenosis and the Factors Influencing the Intensity of the First Heart Sound Dr Eugene A. Stead, Jr  
The Effect of Anemia on the Heart, with Particular Reference to Electrocardiographic Changes Dr Laurence B Ellis  
Influence of the Peripheral Circulation in the Upper Extremities on the Circulation Time as Measured by the Sodium Cyanide Method Dr Paul Kunkel  
Blood Flow and Vasomotor Reactions of the Hand, Forearm, Foot and Calf in Response to Physical and Chemical Stimuli Dr Eugene A Stead, Jr  
Thrombosis of the Ductus Arteriosus with Embolic Manifestations Dr Blair V Jager  
Gummatous Aortitis Dr William H. Gordon.

EDWARD F BLAND, M.D., *Secretary*

### NEW ENGLAND WOMEN'S MEDICAL SOCIETY

The annual meeting of the New England Women's Medical Society will be held at the Myles Standish Hotel, Thursday, January 19

Hon. Paul Dever, attorney general of Massachusetts, will be the speaker

A business meeting will be held promptly at 6 30 p m. Dinner will be served at 7 15

MARY I TOMPKINS, M.D., *Secretary*

### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a luncheon meeting of the surgical section in the Aid Association Room, Talbot Memorial, 82 East Concord Street, on Tuesday, January 17, at 12 o'clock noon.

Surgical deaths during the month of November will be discussed

MILO C GREEN, M.D., *Secretary*

### CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in Andrew Carney Assembly Room on Monday, January 16, at 11 30 a m

#### PROGRAM

Case reports

Anesthesia in Abdominal Surgery Dr H. Bruce MacEwen Discussion Drs Joseph Kennedy, H L. Brayton and John S Kelley

Physicians and medical students are cordially invited to attend

ROY J HEFFERNAN, M.D., *Secretary*



## BOSTON LYING IN HOSPITAL

The next meeting of the Journal Club will be held on Wednesday evening, January 18, at 8 30

Dr Herbert Thoms, of the Yale University School of Medicine, will present a paper "The Obstetric Pelvis" Classification of the abnormal types, roentgenometry and its relation to labor will be illustrated by lantern slides and moving pictures

Physicians and students are invited to attend

DUNCAN E REID, M D, *Secretary*

## MASSACHUSETTS ITALIAN MEDICAL SOCIETY

The next meeting of the Massachusetts Italian Medical Society will be held on Friday evening, January 20, at the Hotel Kenmore, Boston, at 9 00

## PROGRAM

Business meeting

Relations of the Dental Profession to the Medical Field  
V J Pollina, D M D, president of the Italian American Dental Society of New England

Functions of the Board of Registration in Medicine D A Costa, M D

Members of the medical and dental professions are cordially invited to attend.

CARL F MARALDI, M D, *Secretary*

## NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held at the Mallory Institute of Pathology, Boston City Hospital, on Thursday evening, January 19, at 8 00

Dr Paul A Younge will speak on "Pre-invasive Carcinoma of Cervix Uteri"

Physicians and medical students are cordially invited to attend

GRANVILLE A BENNETT, M D, *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JANUARY 16

## MONDAY JANUARY 16

- \*11 30 a m Carney Hospital Monthly clinical meeting and luncheon  
Andrew Carney Assembly Room

## TUESDAY JANUARY 17

- 9 10 a m Joseph H Pratt Diagnostic Hospital Clinicopathological conference Dr Harold Wood Discussion by Dr Chester Keefer
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Massachusetts Memorial Hospitals Luncheon meeting of the surgical section Aid Association Room Talbot Memorial 82 East Concord Street Boston
- \*12 m South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston

## WEDNESDAY JANUARY 18

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*12 m Clinicopathological conference Children's Hospital amphitheater
- \*6 p m New England Society of Physical Medicine Hotel Kenmore
- \*8 30 p m Boston Lying in Hospital Journal Club meeting

## THURSDAY JANUARY 19

- 8 30-9 30 a m Exchange visit, Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Peter Bent Brigham Hospital
- \*9 10 a m Joseph H Pratt Diagnostic Hospital The Management of Lacerations of the Perineum with Special Reference to Complete Lacerations Dr L E Phancuf
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital
- 6 30 p m New England Women's Medical Society Myles Standish Hotel Boston
- \*8 p m New England Pathological Society Boston City Hospital Mallory Institute of Pathology

## FRIDAY JANUARY 20

- 9 10 a m Joseph H Pratt Diagnostic Hospital Varieties of Thrombophlebitis and Their Relation to Embolism Methods of prevention and treatment Dr John Homans
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Clinical meeting of the Children's Medical Service Massachusetts General Hospital Ether Dome
- \*9 p m Massachusetts Italian Medical Society Hotel Kenmore Boston

## SATURDAY JANUARY 21

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY JANUARY 22

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Reasons for High Standards in Medical Education and Practice. Dr Alexander S Begg
- 4 p m Free public lecture Harvard Medical School amphitheater of Building D Cancer Dr Tracy B Mallory

\*Open to the medical profession

JANUARY 15—Lecture at the Faulkner Hospital Page 971 issue of December 15

JANUARY 15—Free Public Lecture Harvard Medical School Page 1056, issue of December 29

JANUARY 15—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29

JANUARY 16—Carney Hospital Page 83

JANUARY 17—Massachusetts Memorial Hospitals Page 83

JANUARY 17—South End Medical Club Page 42 issue of January 5

JANUARY 18—New England Society of Physical Medicine. Page 83

JANUARY 18—Boston Lying in Hospital Journal Club meeting Notice above.

JANUARY 18—Central Massachusetts Alumni Club of Boston University School of Medicine Page 83

JANUARY 19—Medical clinic Peter Bent Brigham Hospital Page 83

JANUARY 19—New England Women's Medical Society Page 83

JANUARY 19—New England Pathological Society Notice above.

JANUARY 20—Massachusetts Italian Medical Society Notice above

JANUARY 23—New England Heart Association Page 83

JANUARY 24—Harvard Medical Society Page 83

FEBRUARY 4 MAY 15 and 16—American Board of Obstetrics and Gynecology Page 451 issue of September 22 (Application for admission to Group A examinations must be on file in the Secretary's office by March 15 instead of April 1 as previously stated)

FEBRUARY 9—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill

MARCH 13—Fourth Annual Postgraduate Institute Page 938 issue of December 8

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 1013 issue of December 22

MARCH 27 31—American College of Physicians Page 36 issue of July 7

MAY 7 15—International Congress of Military Medicine and Pharmacy

Page 501 issue of September 29

MAY 15 16—American Board of Obstetrics and Gynecology Inc Page 937 issue of December 8

MAY 15 19—American Medical Association St Louis Missouri

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute Page 450 issue of September 22

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15 28—Pan Pacific Surgical Association Page 863 issue of November 24

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

FEBRUARY 8—Essex Sanatorium Middleton Clinic at 5 p m Dinner at 7 p m Speaker Dr Edward Churchill Subject Surgical Treatment of Pulmonary Suppuration

MARCH 1—Lynn Hospital Clinic at 5 p m Dinner at 7 p m Speaker Dr John Rock Subject Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

JANUARY 25—Symposium on Diabetes Dr Elliott P Joslin and associates Boston Medical Library 8 15 p m

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

## WORCESTER

FEBRUARY 8—Worcester State Hospital

MARCH 8—Worcester Memorial Hospital

MARCH 12—Worcester Hahnemann Hospital

APRIL 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6-30 p m which is followed at 7 30 p m by the business and scientific sessions

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## THE TREATMENT OF GONORRHEAL AND RHEUMATOID ARTHRITIS WITH SULFANILAMIDE\*

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BOSTON

THE reports to date<sup>1-3</sup> indicate that sulfanilamide is as effective as specific antiserum in the treatment of meningococcal infections. These results and the close biological relations between the meningococcus and the gonococcus have suggested to various workers<sup>4-9</sup> that sulfanilamide might have a similar effect on gonococcal infections. Because of the difficulties encountered in producing gonococcal infections in animals, experimental studies similar to those employed in determining the chemotherapeutic value of sulfanilamide in hemolytic streptococcal,<sup>10-15</sup> meningococcal<sup>16</sup> and pneumococcal<sup>17-18</sup> infections have not been attempted. Therefore establishment of the efficacy of sulfanilamide therapy against gonococcal infections must be based on clinical results.

The results obtained by certain investigators<sup>3, 4, 8, 19-21</sup> suggest that sulfanilamide is effective in treating uncomplicated gonococcal infections. The use of this drug in the treatment of gonorrheal arthritis, however, has been limited.<sup>3, 5, 6, 9</sup> Heretofore we have agreed with other workers<sup>22-26</sup> that artificially induced fever represents the nearest approach to a specific form of therapy for gonorrheal arthritis. We observed that fever therapy was satisfactory in arresting the arthritis in 80 patients, but noted that many of the associated genitourinary infections persisted. Because of the hazards of fever therapy and our inability to cure more regularly the genitourinary focus, we were led to investigate the effect of sulfanilamide§ on gonorrheal arthritis. Sim-

ilar studies were made on patients suffering from rheumatoid arthritis in order to compare the results in an arthritis of unknown origin (rheumatoid arthritis) with those in one of known origin (gonorrheal arthritis). In order to be assured of the greatest possible number of cures, sulfanilamide was administered in most cases in large daily doses for several weeks. The results obtained and the various toxic manifestations—their significance and possible control—observed during and following this form of administration will be presented.

### METHODS EMPLOYED

No case was included as proved gonorrheal arthritis unless the following criteria were satisfied: a history of gonorrheal infection, a history of joint disease consistent with gonorrheal arthritis, the isolation of gonococci from the genitourinary focus or synovial fluid. Probable gonorrheal arthritis was diagnosed when the first two requirements were met and the gonococcal complement-fixation test was positive. To date we have treated 18 cases of gonorrheal arthritis, of which 14 were proved and 4 probable.

One (Case 22) of the 10 cases of rheumatoid arthritis treated with sulfanilamide had an associated gonorrheal genitourinary infection. This patient gave a history of a progressive symmetrical arthritis antedating the onset of the gonococcal infection. Two cases (23 and 24) had a history of a previous urethritis. Both patients had chronic prostatitis and positive gonococcal complement-fixation tests. Gonococci were never isolated in either case. The gonococcal infection antedated the rheumatoid arthritis by two and seventeen years respectively.

Two cases of uncomplicated gonorrhea and 1 with an associated ischial bursitis have been included. They demonstrate the effect of sulfanilamide therapy on the genitourinary focus, as well as illustrate certain toxic manifestations which may be encountered.

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From the Medical Clinic of the Massachusetts General Hospital, the Department of Medicine, Harvard Medical School, and the Massachusetts Department of Public Health.

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Roentgenograms were taken of all involved joints at the time of entry and prior to discharge, and oftener if indicated. Complete blood studies and urinalyses were made at frequent intervals during and following the administration of sulfanilamide. Serum nonprotein nitrogen determinations were usually made prior to and following treatment. Urine-concentration and divided phenolsulfonephthalein urine-excretion tests<sup>27</sup> were made before and after sulfanilamide therapy in a few cases. They were always carried out if there was any reason to suspect the existence of renal impairment. Bromsulfalein liver-function tests were carried out on a few patients prior to and following treatment. Serum-chloride,<sup>28</sup> carbon-dioxide combining power<sup>29</sup> and bilirubin determinations<sup>30</sup> were usually made at biweekly intervals. The sedimentation rates were determined frequently<sup>31</sup>. Free sulfanilamide determinations<sup>32, 33</sup> were made on serum or whole blood at frequent intervals in most cases.

#### ADMINISTRATION OF SULFANILAMIDE

All patients were hospitalized. The sulfanilamide was administered by mouth except in Case 1, in which an initial dose of 90 cc of 2.5 per cent Protosil solution was given intramuscularly. Large doses were employed in all cases unless the drug caused marked gastric or toxic symptoms. In that event it was reduced to two thirds or half the original dose. The dose was calculated in the following manner:  $\frac{3}{4}$  gr per pound of body weight or 1 gm per 20 pounds of body weight, provided the total dose did not exceed 120 gr or 8 gm. In some cases half the total calculated dose was administered initially and again in four hours. Then, in order to maintain a constant blood-sulfanilamide level, one sixth of the total calculated dose was given every four hours day and night. In most cases one sixth of the total calculated twenty-four hour amount was given every four hours, beginning with the initial dose. The latter method did not enable us to maintain so high a blood-sulfanilamide level as is at times necessary. Most patients received such doses of the drug for two weeks or longer. In some cases half or one third the calculated daily dose was continued for another two weeks. In Case 2 the drug was administered in full doses for only one week and then discontinued. An equal dose of sodium bicarbonate was administered with each dose of sulfanilamide except in Cases 3, 15, 18, 21, 30 and 31. This practice seemed to lessen the gastric symptoms, and theoretically speaking is supposed to aid in counteracting the accompanying so-called acidosis<sup>34</sup>.

#### CLINICAL RESULTS

##### *Proved Gonorrheal Arthritis with Infected Synovial Fluids*

Of the 14 cases having proved gonorrheal arthritis, the most significant results were obtained in Cases 1, 2 and 3. These presented extremely painful joints from which gonococci were isolated. This is the type of gonorrheal arthritis which if allowed to go untreated is very liable to end with considerable joint destruction and some permanent loss of function. In order to prove that sulfanilamide is a specific chemotherapeutic agent for gonorrheal arthritis, it must be demonstrated that this form of therapy arrests more promptly and effects a larger percentage of cures in severe gonorrheal arthritis with infected synovial fluids than do other forms of therapy. Conclusions based on the results obtained in the treatment of milder cases of gonorrheal arthritis are very apt to be erroneous, because the end results are very satisfactory in a large percentage of this group when nothing more than bed rest and good supportive treatment are employed. Because the results in Cases 1, 2 and 3 are so striking, the clinical records are presented in some detail.

*Case 1* E S, a 24 year-old, married Italian woman, entered the hospital with a diagnosis of rheumatic fever. Four weeks previously, following coitus, she had developed leukorrhea and dysuria. Four days later she had a severe shaking chill followed by a temperature of 104°F., headache and severe pain in the jaws, neck and lower back. The left knee became acutely swollen and painful 10 days prior to entry. (This knee had been injured 1 month before, but was considered normal just prior to the onset of the arthritis.) The patient had had acute rheumatic fever at the age of 9 without cardiac complications.

Physical examination was normal except for an extremely painful, red, swollen, flexed left knee joint containing an increased amount of synovial fluid, acute endocervicitis and profuse vaginal discharge. The knee was so painful that immobilization with a cast, opiates and analgesics were required. Gonococci were demonstrable in the aspirated synovial fluid and the cervical smears. The temperature for 3 days prior to treatment was 100 to 102°F. X-ray examination of the left knee was negative except for an effusion and swelling of the soft tissue.

Three days after entry the patient received 90 cc. of 2.5 per cent Protosil solution intramuscularly. This was followed by 1 gm. of sulfanilamide plus the same amount of sodium bicarbonate every 4 hours day and night for 11 days. Twenty-four hours after the institution of sulfanilamide therapy, opiates and analgesics were no longer required. Forty-eight hours later the cast was removed. The knee then had 30 degrees of voluntary painless motion, 2 days later this had increased to 90 degrees. Within 2 weeks the knee was painless, motions were normal and weight-bearing was possible. There remained slight swelling in the region of the infrapatellar fat pad. As can be seen from Table 1, the synovial fluid became sterile on the 2nd day of therapy and the synovial fluid leukocyte count fell from an initial level of 41,000 (98 per cent polymorphonuclears) to 1000 (6 per cent polymorphonuclears).

in 7 days. All pelvic smears obtained after the 1st day of treatment were negative for gonococci, and the fixation test never became positive (Table 2). The serum carbon dioxide combining power never fell below 57.4 vol per cent. The initial sedimentation rate was 169 mm per minute, 3, 5 and 12 weeks later it was 0.79, 0.43 and 0.29 mm respectively. The hematologic changes which occurred are presented in Table 3.

had developed acute pain, heat, redness and swelling of the right knee. Until entry she had received no medication other than morphine to control the intense pain. There was no history of other joint involvement, chills or fever. Her husband, who was being treated for gonorrhea, also developed acute pain and swelling in his feet 4 days after the onset of her arthritis.

Physical examination was essentially normal except for

Table 1 *Changes Observed in Infected Synovial Fluids Following the Administration of Sulfanilamide*

CASE NO. (AGE AND SEX)	DAILY DOSE OF SULFANILAMIDE	TIME IN RELATION TO FIRST DAY OF THERAPY	SYNOVIAL FLUID FINDINGS					
			AMOUNT	LEUCOCYTES	POLYMORPHO- NUCLEAR LEUCOCYTES	SUGAR	CULTURE	GNOCOCCAL COMPLEMENT FIXATION TEST
	gm	day	cc	per cu mm	%	mg %		
1 (24 F)	7.5 (1st day) 6.0 (10 days)	Before	60	41 000	98	29.0	Positive	Negative
		After	25	13 200	98	82.4	Negative	Negative
		2nd th	2	1 000	6	Not tested	Negative	Not made
2 (39 F)	7.0 (7 days)	Before	20	90 000	95	Trace	Positive	Positive
		After	None					
		3rd 4th	0.5	Bloody	86	Not tested	Negative	Not made

Cyanosis was present throughout the period of therapy. The temperature which had been 102 to 105°F from the 4th to the 11th day disappeared 24 hours after discontinuance of the drug. No other toxic symptoms were noted.

**Summary.** A patient with proved acute gonorrheal arthritis and endocervicitis responded promptly to large doses of sulfanilamide. She made a complete recovery

an intensely painful, red, swollen effused right knee, edema of the right lower leg, profuse vaginal discharge, endocervicitis and pallor of the mucous membranes and skin. The knee was held in 5-degree flexion. The overlying skin was hot. Because of the intense pain the patient resisted any attempt to move the joint. Gonococci were demonstrated in the smears and cultures of the

Table 2 *Effect of Sulfanilamide Therapy on Genitourinary Foci of Gonococcal Infection*

CASE NO.	SEX	GNOCOCCI IN GENITOURINARY TRACT			GNOCOCCAL COMPLEMENT FIXATION TEST ON SERUM			TIME FOLLOWED	REMARKS
		BEFORE TREATMENT	AFTER THIRD DAY OF TREATMENT	NO. OF EXAMINATIONS	AT TIME OF ENTRY	AT TIME OF DISCHARGE	AT TIME OF FOLLOW-UP		
								wk	
1	F	Yes	No	3	Negative	Negative	Negative	46	
2	F	No	No	3	Negative	Negative	Negative	7	
3	F	Yes	No	5	Negative	Negative	Negative	4	
4	F	Yes	No	3	Positive	Positive	Negative	48	
5	F	Yes	No	3	Positive	Positive	Negative	20	
6	F	Yes	No	4	Negative	Positive	Negative	8	
7	M	Yes	No	4	Positive	Positive	Positive	4	No urethral discharge after 2nd day of therapy
8	M	Yes	No	3	Positive	Positive	Negative	12	No urethral discharge after 2nd day of therapy
9	M	Yes	Yes	10	Positive	Positive	Positive	7	Gonococci still present after 7 gm. of sulfanilamide given each day for 7 days. Disappeared after increasing dose to 9.3 gm.
10	M	Yes	No	3	Positive	Positive	Positive	3	No urethral discharge after 2nd day of therapy
11	M	Yes	No	4	Positive	Positive	Positive	3	No urethral discharge after 2nd day of therapy
12	M	Yes	No	6	Positive	Positive	Negative	8	No urethral discharge after 1st day of therapy
13	M	Yes	No	4	Negative	Positive	Negative	8	No urethral discharge after 2nd day of therapy
14	M	Yes	Yes	10	Positive	Positive	Positive	8	Genitourinary symptoms unaffected.
15	F	No	No	6	Positive	Positive	Positive	6	
16	F	No	No	4	Positive	Positive	Positive	28	
17	M	No	No	4	Positive	Positive	Positive	16	No genitourinary symptoms at onset of therapy
18	F	No	No	3	Positive	Positive	Negative	44	
21	M	Yes	No	3	Positive	Positive	Negative	12	No urethral discharge after 2nd day of therapy
22	M	Yes	No	4	Positive	Positive	Positive	4	No urethral discharge after 2nd day of therapy
24	M	No	No	4	Positive	Positive	Negative	4	No genitourinary symptoms at onset of therapy
27	F	Yes	No	3	Negative	Negative	Negative	8	
28	M	Yes	No	3	Negative	Negative	Negative	8	No urethral discharge after 2nd day of therapy

Subsequently no gonococci demonstrable by culture or smear

after 11 days of such therapy. During a 46-week follow-up period, she has remained well, all clinical examinations and laboratory tests being normal.

**Case 2.** A S., a 39-year-old, married woman, entered the hospital with acute gonorrheal arthritis and endocervicitis. Five months previously she had noticed a profuse leukorrhea, frequency of urination, dysuria and nocturia. Three weeks prior to entry, after scrubbing the floor she

synovial fluid none were ever found in repeated pelvic smears. The highest temperature recorded prior to treatment was 99.5°F. Roentgenograms showed considerable soft tissue swelling and a joint effusion. There was moderate flecky decalcification of the femoral and tibial condyles. The medial surfaces of both the femur and the tibia showed areas of destruction.

Sulfanilamide therapy was begun on the day of entry.

Table 3 Hematologic Variations Observed During Sulfanilamide Therapy

CASE NO. (AGE AND SEX)	SULFANILAMIDE (TOTAL DOSE)	TIME IN RELATION TO FIRST DAY OF THERAPY	LABORATORY DATA						CASE SUMMARY AND REMARKS
			ERYTH- RO- CYTES	HEMO- GLO- BIN*	LEU- KO- CYTES	POLY- MORPHO- NUCLEAR LEUKO- CYTES	RETICU- LO- CYTES	SERUM BILI- RUBIN	
		day	$\times 10^6$	%	$\times 10^3$	%	%		
1 (24 F)	90 cc (2.5%) Prontosil intramuscu- larly then 66 gm in 11 days	Before	3.3	80	15.2	79	Not done	Not done	Eighth day stained smears showed red cells filled with hemoglobin a preponderance of macrocytes, a few microcytes and immature erythrocytes. Forty five per cent of polymorphonuclear leukocytes young forms. Volume index 1.3 color index 1.2. Ninth and 16th days 600-cc blood transfusions.
		After							
		8th	2.9	70	8.0	78			
		15th	3.9	80	7.0	76			
2 (39 F)	49 gm in 7 days	Before	3.6	65	9.0	75			Ninth day blood smear similar to Case 1. Thirteenth day volume index 1.4 color index 1.4. Anemia not treated. No urobilinogen observed. Uneventful recovery.
		After							
		7th	2.5				7		
		9th	2.2	50	28.6	80	12		
		12th	2.0	55	18.5	65	22	Normal	
		13th	1.8	55	12.0				
		20th	3.4	50	10.3	72	6		
3 (18 F)	79.2 gm in 12 days	Before	4.7	90	10.7	79			Beginning on the 6th day 1.02 gm. of ferrous sulfate given each day. Fourteenth day blood smear similar to Case 1. Nineteenth day volume index 1.4 color index 0.9. No urobilinogen observed. Fragility test normal.
		After							
		14th	2.4	60	6.1	69	0.4	Normal	
		15th	2.4	70	7.6	68	9		
		16th	2.4	65	5.5	68	15		
		17th	2.6	60	5.3		20		
		18th	2.7	50	5.5		10		
		30th	3.4	70	5.8				
		34th	3.0	60	1.8	43	1		
		37th	3.3		4.0	48			
		38th	3.7	70	5.5				
4 (36 F)	130.6 gm in 25 days	Before	4.0	70	10.6	70		Not done	Twenty fifth day blood smear showed reduction in percentage of polymorphonuclear leukocytes. No treatment for leukopenia. Volume index 1.1 color index 0.9.
		After							
		25th	3.5	70	2.8				
		27th	3.4	68	2.8	50	3		
		33rd	3.7	75	7.2	50	1		
5 (27 F)	68.0 gm in 18 days	Before	4.4	90	14.0	78	0		Eighteenth day blood smear similar to Case 1. Color index 1.2. Anemia not treated.
		After							
		6th	3.8		9.0		4		
		9th	2.8		8.1		11	Normal	
		18th	2.4	60			10		
9 (39 M)	100.3 gm in 14 days	Before	5.1		14.2	79	2		Twenty first day blood smear similar to Case 1. Anemia not treated.
		After							
		16th	4.0		14.5	73	0.5	Normal	
		21st	3.5		15.2	63	4		
		28th	4.1	80	8.2		4		
10 (42 M)	259.3 gm in 43 days	Before	4.9	82	12.2	82			Twenty fourth day blood smear similar to Case 1. Color index 1.2. Forty second day 500-cc blood transfusion.
		After							
		28th	3.2	80	12.2	80	4	Normal	
		36th					12		
		40th	3.4	80			4		
11 (32 M)	133.8 gm in 25 days	Before	4.9	90	15.2	88	0		Twenty second day 10 per cent eosinophils blood smear similar to Case 1. Anemia not treated.
		After							
		25th	3.3	70	11.5	79	5	Normal	
12 (35 M)	134 gm in 22 days (1st course)	Before	4.8	75	12.6	73			Fourteenth and 25th days blood smears similar to Case 1. Color index 0.9. Forty-eighth day 500-cc blood transfusion prior to second course of sulfanilamide.
		After							
		14th	3.2		10.7	87	3	Normal	
		25th	3.0	60	7.5			Normal	
13 (27 M)	82 gm in 13 days (1st course)	Before	4.6	80	14.0	67			Thirteenth day blood smear similar to Case 1. Color index 0.9. No treatment for anemia.
		After							
		13th	3.5	60	14.1	60	5	Normal	
		50th	4.7	70	10.8			Normal	
14 (26 M)	126 gm in 21 days	Before	3.8	65	9.9	72			Twenty-eighth day blood smear similar to Case 1. Color index 1.0. Thirty ninth day 500-cc blood transfusion.
		After							
		28th	2.9	50	10.3	62	3	Normal	
		40th	4.2	75	10.0			Normal	
16 (30 F)	94.5 gm. in 18 days	Before	4.3	80	10.5	75			Thirteenth day blood smear similar to Case 1. Twenty first day volume index 1.2 color index 1.0. After 14th day 1.02 gm of ferrous sulfate given daily for 3 weeks.
		After							
		13th	3.7	70			13	Normal	
		18th	3.7	82			10	Normal	
		21st	3.5	74	5.5		6		
25 (37 F)	84 gm in 14 days	Before	3.5	65	10.7			Not done	Fifteenth day blood smear similar to Case 1. Twenty fifth day 500-cc transfusion given as supportive measure for arthritis.
		After							
		9th	3.2		12.3	67			
		15th	2.4	45					
		25th	3.4	70	13.7				
		32nd	3.5		9.0	75			
27 (44 F)	90 gm in 24 days	Before	4.3	64	9.1	69	0.4		Twentieth day blood smear similar to Case 1. Anemia not treated.
		After							
		20th	2.7	65	4.8	65	6	2.5 mg %	
		24th	2.6	65	5.6	35	0.4		
		29th	3.7	70	6.1	78			
		64th	4.3		8.3	57			

She received 7 gm a day for 7 days. This dosage maintained a blood sulfanilamide level of 94 mg per cent. Forty-eight hours after institution of sulfanilamide therapy there was marked reduction of pain and swelling. Much of the redness and throbbing pain had disappeared. Three days after starting therapy there was 10 degrees of painless motion. One week after treatment the knee could be flexed 45 degrees and extended to 180 degrees. Ten days later 90 degrees of flexion was possible without pain. At this time a moderate degree of soft-tissue swelling persisted, particularly in the region of the quadriceps pouch. At the time of the 7-week follow-up, walking was painless, extension 180 degrees and flexion 90 degrees.

No synovial fluid was obtained on the 3rd day, and that aspirated on the 4th day was sterile. The blood complement fixation test on the day of entry was negative and never became positive, whereas the synovial fluid obtained on the day of entry was positive. The initial sedimentation rate was 175 mm per minute, 3, 5, 7, 11 and 13 days later it was 136, 136, 043, 025 and 018 mm respectively. The hematologic variations noted were a reticulocytosis of 22 per cent, a macrocytic anemia and a marked leukocytosis (Table 3). The serum bilirubin remained normal. The serum carbon-dioxide combining power fell to 48.3 vol per cent. The lowest serum chloride observed was 97 milliequivalents.

Roentgenograms taken 10 days after cessation of therapy revealed no effusion and only slight soft tissue swelling. The previously described changes were still present but seemingly less marked. Four weeks later the flecky decalcification and a small area of destruction in the tibial condyle were still present. Four weeks later the x-ray report read: 'The joint surfaces visible are well restored. Subchondral, flecky decalcification in the subchondral regions of all the bones forming the knee joint is still present. No soft tissue swelling is demonstrable.'

Cyanosis and mild vertigo were present during the period of treatment. No other toxic symptoms were noted.

**Summary** An acute case of proved gonorrheal arthritis of 21 days duration was promptly arrested by the institution of sulfanilamide therapy, as shown by marked subsidence of the joint signs and symptoms and sterilization of the synovial fluid.

**Case 3** K. W., an 18-year-old, single Negress, entered the hospital with a diagnosis of acute rheumatic fever. Ten days prior to entry she had developed an acute upper respiratory infection with associated sweating, malaise and generalized aching. One day later the right wrist and both elbows became hot, swollen and tender. There was no previous history of genitourinary or arthritic symptoms.

Physical examination was normal except for exquisitely painful and swollen right wrist and elbows, acute endocervicitis and a profuse vaginal discharge. The left elbow was so painful as to forbid motion. Gonococci were found in the synovial fluid from the left elbow and in the cervical smears. During the 8 days preceding sulfanilamide therapy analgesics and opiates were necessary to control pain. During this time the temperature fluctuated between 99.5 and 103 F. X-ray examination showed marked soft-tissue swelling of the involved joints and atrophy of the bones of both elbows.

Eight days after entry sulfanilamide therapy was begun, the patient receiving 6.6 gm per day for 12 days. Forty-eight hours after the institution of therapy analgesics and opiates were no longer required, the motions present were painless and marked reduction of the swelling had occurred. From this time on improvement was rapid.

Three days later massage and passive motions were begun. At this time the left elbow had approximately 120 degrees of motion. Nine days after cessation of treatment the joints were symptom free and motions were normal except for the left elbow, which lacked 5 degrees of full extension. Five pelvic smears after the 1st day of treatment were negative. The blood complement fixation test, which was doubtful on entry, never became positive. The initial sedimentation rate was 212 mm per minute, 1, 3 and 4 weeks later it was 1.95, 1.84 and 1.07 mm respectively. Sulfanilamide therapy apparently caused a marked macrocytic anemia, a reticulocytosis of 20 per cent and a leukopenia of 1800 (Table 3). Icterus, bilirubinemia and urobilinogenuria were never demonstrable.

Repeated x-ray examinations revealed no other changes than those noted. The effusion and soft tissue swelling disappeared 3 weeks after the institution of therapy.

The patient was slightly drowsy and occasionally euphoric during the period of treatment. No other toxic symptoms were observed.

**Summary** A patient with proved acute gonorrheal arthritis and endocervicitis made an excellent recovery after 12 days on large doses of sulfanilamide. At the time of discharge she had slight stiffness of the left elbow on full extension.

These 3 cases of proved acute gonorrheal arthritis with infected synovial fluids were promptly arrested following the administration of large doses of sulfanilamide. Cases 1 and 3 illustrate the desirability of instituting such therapy as early as possible if irreparable joint damage is to be prevented and normal joint function preserved. In Case 2 the response to therapy was equally as prompt as in Cases 1 and 3, as shown by the marked clinical improvement and sterilization of the infected synovial fluid. Repeated roentgenograms demonstrated that destruction of the joint was arrested and recalcification of the subchondral bone made possible. However, sufficient intra-articular changes had taken place prior to the institution of therapy to prevent restoration of normal joint function. From the results in these cases it is apparent that with large doses of sulfanilamide marked clinical improvement can occur as early as forty-eight to seventy-two hours following their institution. Corroborative laboratory evidence of this improvement is obtained from repeated synovial-fluid analyses. Such analyses reveal that the infected fluid may become sterile within forty-eight hours (Table 1). With the sterilization of the synovial fluid the cytologic abnormalities may be restored to practically normal values within seven days. The genitourinary foci seemed to respond equally as well to sulfanilamide, in that no gonococci were isolated after forty-eight hours of therapy. The blood complement-fixation test never became positive in these cases. These results suggest that if large doses of sulfanilamide are to be therapeutically effective in a given case, improvement may be expected as early as forty-

Table 4 Clinical Results Observed in Patients with Gonorrheal Arthritis Treated with Sulfanilamide

CASE NO. (AGE AND SEX)	DURATION OF INJECTION (UNTIL JOINTS UNARY)	SULFANILAMIDE DAILY DOSE	TIME IN RELATION TO FIRST DAY OF THERAPY	BLOOD LEVEL	TOXIC MANIFESTATIONS	LABORATORY DATA				SERUM BILIRUBIN	CASE SUMMARY AND REMARKS
						SEDIMENTATION RATE	PLASMA CARBON DIOXIDE COMBINING POWER	VARIATIONS OF SERUM CHLORIDES	SWELLING OF JOINTS		
	days	gm	day	mg %		mm per min	vol %	milliequival			
4 (36 F)	8	8.0 (2 days) 6.0 (18 days) 1.3 (5 days)	Before After 21st 8th	10.0+ 10.0+	Cyanosis anemia * leukopenia	1.87 0.54 0.36	50.1	101 104	Normal	Severe acute arthritis (proved) of the left ankle and small joints of the left foot requiring morphine. Roentgenograms showed atrophy and soft tissue swelling. Marked reduction of pain and swelling after 48 hours therapy. Sedation and analgesics discontinued and cast removed. Uneventful recovery 8 month follow up. Roentgenograms showed recalcification.	
5 (18 F)	9	7.0 (1 day) 4.0 (3 days) 6.0 (6 days)	Before After 7th 140th		Cyanosis 10th day exposed to sun light few hours later edema and purplish discoloration of face neck and hands	1.78 0.57 0.35	Not done	Not done	Not done	Moderate severe acute arthritis (proved) of right wrist ankle and small joints of foot associated with petechial rash. Roentgenograms showed soft tissue swelling. Marked subsidence of pain and swelling after 72 hours therapy. Complete recovery in 4 weeks. Remained well during a 6-month follow up period.	
6 (27 F)	7	6.0 (5 days) 4.0 (6 days)	Before After 8th 56th		Cyanosis lassitude nausea met hemoglobinemia anemia *	Not done 0.28	53.6	92 101	Normal	Severe acute arthritis (proved) of left shoulder requiring morphine. Roentgenograms showed atrophy and effusion. Pain and swelling improved after 48 hours therapy. Effusion disappeared. Two months later there was no pain but 10-degree limitation in external rotation remained.	
7 (40 M)	24	6.0 (14 days) 2.0 (11 days)	Before After 14th 21st	12.0+	Cyanosis anorexia drowsiness euphoria	1.27 0.74 0.54	53.9	101 103	Normal	Severe acute arthritis (proved) of right wrist with x ray evidence of joint destruction on entrance. Much less pain after 72 hours therapy. Motions 95 per cent normal in 2 weeks. Back to work as a barber in 6 weeks. Roentgenograms showed recalcification. Two-month follow up 95 per cent motion.	
8 (53 M)	60	6.0 (5 days) 4.0 (4 days) 2.6 (6 days)	Before After 28th		Cyanosis nausea vertigo leukocytosis (following therapy)	Not done				Painful left calcaneus and acute arthritis (proved) of left ankle. Roentgenograms showed periostitis and slight joint destruction. After 3 days much less pain. Slight residual ache in left ankle 1 month follow up. Three months later symptom free. Roentgenograms normal except for residual periostitis.	
9 (36 M)	14	7.0 (7 days) 9.3 (1 day) 7.0 (6 days)	Before After 1st 10th 14th 21st 31st	6.5+ 11.8 11.8+	Cyanosis anemia *	Not done 1.51 1.00 0.88 0.67 0.33	Not done	Not done	Not done	Mild acute arthritis (proved) of right wrist with tenosynovitis. During the first 7 days of therapy no improvement in arthritis or genitourinary symptoms. Forty eight hours after increasing dose of sulfanilamide joint pain decreased and smears became negative for gonococci. One hundred per cent recovery of joint function 12 week follow up period.	
10 (47 M)	10	6.0 (3 days) 7.3 (1 day) 6.0 (39 days)	Before After 10th 16th 40th	5.0+ 11.0+ 9.0+	Cyanosis anemia *	1.32 0.68 0.53 0.68	50.8	98 107	Normal	Severe acute arthritis (proved) of left 2nd 3rd and 4th metatarsophalangeal and left sacroiliac joints. Slow improvement of arthritis during first 72 hours of therapy. This improvement was greatly accelerated when the dose of sulfanilamide was increased. Roentgenograms negative except for decalcification of left sacroiliac joint. One hundred per cent recovery 8 week follow up.	
11 (37 M)	14	6.0 (2 days) 4.8 (1 day) 3.0 (5 days) 6.0 (17 days)	Before After 5th 12th 26th 35th		Unilateral rash and edema of face 22nd day fever anemia * met hemoglobinemia	Not done 1.32 0.22 0.57 0.38	55.3	96-100	Normal	Severe acute arthritis (proved) right sacroiliac left knee and costosternal joints. Bilateral conjunctivitis (proved). Marked improvement of arthritis and conjunctivitis during the first 48 to 72 hours of therapy. One hundred per cent recovery 12 days after stopping therapy. Symptom free 6 month follow up.	

12 (35 M)	10	5	8.0 (1 day) 6.0 (21 days)	6.0 +	Before After: 15th 29th 35th	Cyanosis anemia *	1.50 1.30 0.97 1.35	55.5	98-105	Normal	Severe acute arthritis (proved) of left knee ankle 2nd and 3rd metacarpophalangeal joints Small doses of sulfanilamide prior to entry had no effect on arthritis conjunctivitis or genitourinary symptoms Smears negative 48 hours after giving sulfanilamide in large doses Arthritis indicated Second course of sulfanilamide (larger doses) followed by marked improvement of arthritis in 72 hours No residual joint symptoms or signs
13 (27 M)	74	5	(second course) 2.0 (6 days) 4.0 (6 days) 6.0 (6 days) 8.0 (6 days)	3.1 5.6 10.4 + 15.0 +	Before After: 8th 22nd	Cyanosis nausea anemia	0.94 0.74 0.51 0.40 0.10	41.0	Not done	Not done	Severe acute arthritis (proved) of left knee right foot and temporomandibular joints Bilateral conjunctivitis acute urethritis and prostatitis 15 gr sulfanilamide each day for 6 days 3 weeks prior to entry without effect on the above complaints Seventy two hours after large doses urethritis prostatitis and conjunctivitis disappeared Arthritis unchanged Second course of therapy resulted in marked improvement of arthritis within 72 hours once the patient received 8 gm daily Uneventful recovery without joint residual
14 (26 M)	150	134	(second course) 6.0 (1 day) 8.0 (13 days)	6.0 + 10.0 +	Before After: 49th 63rd 112th	Cyanosis nausea	1.90 1.73 1.51	55.5	97-106	Normal	Severe chronic arthritis (proved) of fingers wrists elbows, shoulders knees ankles and feet and marked keratoderma blennorrhagicum of 4½ months duration Roentgenograms revealed soft tissue swelling marked bone atrophy and flecky decalcification of the involved joints Small doses of sulfanilamide prior to onset of arthritis without effect on urethritis Sulfanilamide in large doses resulted in slow, steady improvement of arthritis and keratoderma No effect on prostatitis Ten days of Neosalvor infusions given Four months later normal skin and nails residual deformity of second midphalangeal joints other joints normal Smears and cultures after three prostatic massages were all negative for gonococci Back at work as a carpenter
15 (26 F)	?	7	4.0 (29 days)	11.7— 17.4	Before After: 14th 21st 35th 77th 119th	Cyanosis anemia *	1.61 1.43 1.63 1.21 1.09 0.58	50.7	105-109	Normal	Severe acute arthritis (probable) of wrists knees left metacarpophalangeal and metatarsophalangeal joints Tenosynovitis left wrist Roentgenograms showed soft tissue swelling Forty eight hours after starting sulfanilamide relatives discontinued and swelling had subsided Two and one half weeks later walking symptom free Three month follow up 100 per cent recovery
16 (30 F)	42	21	4.0 (12 days) 3.0 (14 days)		Before After: 14th 63rd	Cyanosis vertigo anorexia anemia * methemoglobinemia	1.53 0.23 0.16	54.7	104-107	Normal	Subsiding acute arthritis (probable) of right wrist with roentgenographic evidence of joint destruction and narrowing Four days after therapy pain less and cock-up splint removed Four months later 5 per cent motion in right wrist
17 (26 M)	90	75	10.7 (1 day) 8.0 (16 days) 6.0 (12 days) 8.0 (7 days)	9.0 + 6.2 + 6.2 + 10.5 +	Before After: 7th 14th 25th 42nd	Cyanosis	0.61 0.38 0.68 0.30 0.39	42.0	101-109	Normal	Moderate chronic arthritis (probable) of left calcaneus right ankle knees right scrolicae Roentgenograms showed flecky bone atrophy After starting of therapy joint pain and effusion of the right knee gradually subsided during a 2 week period Four month follow up 100 per cent recovery
18 (35 F)	60	54	6.0 (10 days)		Before After: 120th	Cyanosis; urticaria and edema of face on 10th day	0.90 0.32	Not done	Not done	Not done	Subacute subsiding arthritis (probable) of right shoulder elbow wrist and hand Right hand swollen with muscle atrophy Roentgenograms of right elbow joint showed atrophy narrowing and new bone formation Very gradual improvement of pain and swelling during 10 days of therapy Eleven month follow up 90 per cent recovery of normal joint function

\*See Table 3 for detailed data concerning anemia



eight to seventy-two hours after institution of treatment

*Proved Gonorrheal Arthritis with Synovial Fluids Containing No Demonstrable Gonococci*

Six (Cases 4, 5, 6, 7, 8, and 11) of the remaining 11 patients with proved gonorrheal arthritis obtained marked relief of their joint symptoms two to three days after the institution of sulfanilamide therapy (Table 4). Of these 6 patients, 4 (Cases 4, 5, 8 and 11) made uneventful recoveries with complete restoration of joint function. Two patients (Cases 6 and 7) failed to regain normal joint function. Their joints were 90 to 95 per cent normal at the time of the last follow-up. In these 2 cases there was roentgenologic evidence of joint destruction prior to treatment

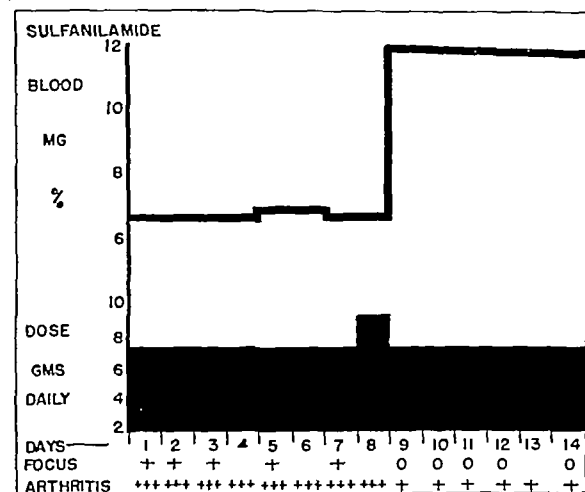


Chart 1 Case 9

*This chart shows that the gonococcal prostatitis and arthritis failed to respond when the blood sulfanilamide level was kept at 6.4 mg per cent. Twenty-four hours after reaching a level of 11.8 mg per cent the joint pain diminished and gonococci disappeared from the prostatic smears and cultures.*

Two patients (Cases 9 and 10) in this group with arthritis of short duration and no roentgenologic evidence of joint destruction failed to show obvious improvement in their joint symptoms until the sulfanilamide dosage had been increased sufficiently to raise the blood-level above 10 mg per cent. They both regained normal joint function. In Case 9 the genitourinary focus did not become negative until the blood sulfanilamide reached 11 mg per cent (Chart 1).

Two other patients (Cases 12 and 13) with arthritis of four and seven days' duration and without roentgenologic evidence of joint destruction were first treated with large doses for thirteen and twenty-two days respectively. In neither case was the improvement in the arthritis any more

rapid than might be expected with good conservative treatment and bed rest. The blood sulfanilamide level never rose above 6.8 mg per cent in either patient. Although the arthritis was seemingly uninfluenced by the drug, gonococci could not be isolated from the genitourinary foci after the second day. The fixation tests became negative forty-three and forty-four days respectively after cessation of therapy. From Table 5 it is seen that the cytologic abnormalities in the synovial fluid were uninfluenced by the drug, corroborating the clinical impression that no improvement in the arthritis had occurred. These 2 patients had received small doses (10 to 15 gr three or four times a day) of sulfanilamide prior to entry, without benefit. The drug was readministered in both these cases (Table 4, Cases 12 and 13) in order that we might note the effect of therapy with a blood level of 10 mg per cent or higher. Seventy-two hours after the blood-sulfanilamide level had reached 10 mg per cent the joint pains had subsided. One week later the knee effusions had completely disappeared.

One patient (Case 14) entered the hospital during the fifth month of his arthritis. He had an associated keratoderma blennorrhagicum, with the characteristic skin and nail lesions. His improvement following sulfanilamide administration (large doses for 7 days on one occasion and 14 days on another) was very slow but progressive. The skin and nail lesions seemingly cleared more rapidly than they do in untreated cases. Despite the fact that he received sufficient sulfanilamide to maintain a blood-sulfanilamide level from 11.7 to 17.4 mg per cent, gonococci were still present in the prostatic smears after the two courses of therapy.

This patient had also received small doses of sulfanilamide prior to the onset of his arthritis. At the time of discharge five weeks after the second course of sulfanilamide therapy, the skin and nails were normal but there was still some residual morning aching and stiffness. The deformity of the left first metacarpophalangeal and the right first mid phalangeal joints persisted. Two months later the patient returned to his work as a carpenter and was normal except for the last mentioned residual joint deformities. Because of failure to cure the genitourinary focus, he was given 10 per cent Neosilvol urethral instillations three times a day for ten successive days prior to discharge. During the follow-up period he received prostatic massages two or three times a week. Three months following discharge gonococci were no longer demonstrable in the prostatic smears. Three subsequent prostatic smears and cultures obtained after this were likewise negative for gonococci.

Thus it will be seen that in this group the results were equally as satisfactory in Cases 4, 5, 6, 7, 8 and 11 as they were in the patients with infected synovial fluids. The results in Cases 9, 10, 11 and 12 suggest that blood-sulfanilamide levels of 10 mg per cent or higher are at times necessary to bring about clinical cures. It is interesting that the patients (Cases 12, 13 and 14) who did not respond so favorably as the others in this group had received small doses of the drug—and during the day only—prior to hospital entry. This might be interpreted to mean that sulfanilamide administered in doses too small to effect a cure may increase the resistance of the

tion prior to treatment and only 5 per cent normal motion was regained. In the 2 remaining patients (Cases 17 and 18) with probable gonorrheal arthritis immediate improvement forty-eight to seventy-two hours after the institution of therapy was not observed. In Case 17, although the arthritis had been present for seventy-five days before receiving the drug, the roentgenograms revealed no evidence of joint destruction. This patient made a complete recovery except for slight residual aching. In Case 18 the patient showed evidence of narrowing and destruction of the left elbow joint at the time of entrance into the hospital, fifty-four days after onset of her disease.

Table 5 *Synovial Fluid Findings in Two Cases of Gonorrheal Arthritis Which Failed to Respond to the First Course of Sulfanilamide Therapy*

CASE NO (AGE AND SEX)	DAILY DOSE OF SULFANILAMIDE	TIME IN RELATION TO FIRST DAY OF THERAPY	SYNOVIAL FLUID FINDINGS*				
			AMOUNT	LEUCOCYTES	POLYMORPHO- NUCLEAR LEUCOCYTES	CULTURE	GONOCOCCAL COMPLEMENT FIXATION TEST
	gm	day	cc	per cu mm	%		
12 (35 M)	8.0 (1st day)	Before	85	16,000	89	Negative	Positive
	6.0 (21 days)	After					
		2nd	20	68,000	95	Negative	Positive
		7th	60	29,100	86	Negative	
		14th	40	8,700	88	Negative	Positive
		21st	10	11,200	78	Negative	
		27th	10	12,200	2	Negative	
13 (27 M)	8.0 (1st 2 days)	Before	60	23,000	98	Negative	Negative
	6.0 (11 days)	After					
		2nd	46	49,000	94	Negative	Negative
		7th	40	17,900	63	Negative	
		14th	40	11,300	58	Negative	Positive
		21st	18	4,600	52	Negative	Negative
		36th	40	10,200	78	Negative	

\*Synovial fluid sugars in both instances were normal throughout the period of observation.

organism. The clinical results observed in these last 3 cases suggest the possibility that the organisms in the joint and the genitourinary focus were not equally susceptible to the drug. However, we have no proof for such statements.

The results obtained in these 11 cases show that proved gonorrheal arthritis without demonstrable gonococci in the synovial fluids, if treated with large doses of sulfanilamide, may respond equally as well and as promptly as do cases having infected synovial fluids. They also demonstrate the necessity of adequate treatment being instituted early if the largest potential percentage of cures without residual joint changes is to be obtained.

#### *Probable Gonorrheal Arthritis*

Two of the 4 patients with probable gonorrheal arthritis (Cases 15 and 16) responded as promptly to sulfanilamide therapy as did any one of the patients in the two previous groups. In Case 15 there was complete recovery. Case 16 showed roentgenologic evidence of joint destruc-

tion. She improved gradually. At the time of the last follow-up the left elbow joint had 90 per cent of normal motion. At the onset of her arthritis this patient had received 5 gr of sulfanilamide four times a day for twenty-one days.

The results in this group again suggest the importance of early treatment with large doses in order to obtain the highest percentage of clinical cures.

#### *Rheumatoid Arthritis*

In an attempt to establish that the clinical cures observed in this group of patients with gonorrheal arthritis represented a specific effect of sulfanilamide therapy on the gonococcus, it was deemed necessary to obtain similar data from cases with some other type of arthritis. Patients with rheumatoid arthritis were chosen because this disease is one of unknown etiology and has many features suggesting an infectious origin. It was thought that the results obtained in this group would also enable us to determine whether or not rheumatoid arthritis is due to an infectious agent.

which is similarly affected when exposed to large doses of sulfanilamide

A total of 10 patients with rheumatoid arthritis were treated. Nine of them received large doses of sulfanilamide for periods varying from eight to twenty-seven days (Table 6). In Case 19 the patient became so apprehensive because of mild gastric symptoms and vertigo that the dose was reduced on the third and fourth days and was discontinued four days later. Except in Case 20 there occurred no improvement in joint symptoms and no appreciable drop in sedimentation rates during the time sulfanilamide was given or during the subsequent follow-up periods. In fact, 2 of the patients (Cases 21 and 22) developed joint effusions during the period of therapy. In Case 20 the patient, who had typical mild rheumatoid arthritis of seven and a half months' duration, experienced almost complete relief subsequent to the development of a continuous fever (102 to 103°F for eight days). The fever disappeared promptly following the discontinuance of the drug. In this case the sedimentation rate returned to normal ten days after treatment. It was still normal nine weeks later. At this time the patient complained of joint symptoms, which required acetylsalicylic acid for control. Judging from our past experience with fever therapy in patients with rheumatoid arthritis,<sup>35</sup> it seems fair to ascribe the improvement noted in this particular case to the eight days of continuous fever caused by the drug. Mild rheumatoid arthritis of short duration is the type which responds most favorably to fever therapy.

In Case 22 the gonorrheal urethritis and prostatitis of six months' duration were clinically cured after the third day of therapy, but the arthritis of four years' duration was unaffected. In Case 21, with a chronic prostatitis of ten years' duration and a positive complement-fixation test, the patient noted no improvement in his arthritis (eight years' duration) during or following sulfanilamide therapy. The prostatitis improved and the complement-fixation test became negative. Case 24, with mild rheumatoid arthritis of four months' duration, showed a chronic prostatitis (seventeen years' duration) and a positive complement-fixation test. Sulfanilamide therapy resulted in marked improvement in the prostatitis and the complement-fixation test became negative. The arthritis, however, was uninfluenced.

From the clinical results obtained in these 10 cases of rheumatoid arthritis, it seems fair to conclude that sulfanilamide therapy does not exert any specific effect on the agent causing rheumatoid arthritis, nor does it influence the course of the disease. Failure to affect the arthritis in 3

of these patients, despite the fact that the gonococcal foci improved, is further evidence that sulfanilamide has a specific effect on the gonococcus and none on the agent responsible for rheumatoid arthritis.

#### EFFECT ON THE SEDIMENTATION RATE

The sedimentation rate was tested at frequent intervals in order to determine whether it fell as the gonorrheal arthritis improved. From Table 4 and Chart 2 it will be seen that such a relation

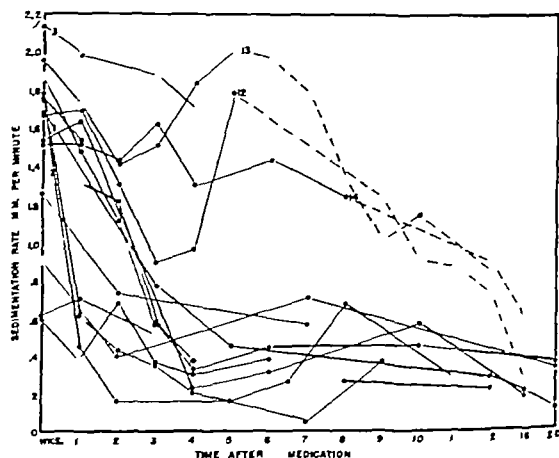


Chart 2 Corrected Sedimentation Rates in Cases of Gonorrheal Arthritis

Here one notes that there occurred a rapid decrease in the corrected sedimentation rates of the bloods of most of the patients with gonorrheal arthritis following the institution of sulfanilamide therapy. Cases 1, 2 and 3 had infected synovial fluids. Cases 12, 13 and 14 did not respond to the first course of sulfanilamide therapy (solid line) but did respond when it was administered a second time (broken line). The normal corrected sedimentation rate varies from 0.08 to 0.35 mm per minute.

was found with great regularity. It should be noted that the most rapid decrease in sedimentation rate took place in the patients showing striking improvement and that in the cases which improved slowly a correspondingly slow return of the sedimentation rate to normal was observed. The sedimentation rates remained fairly constant in 3 patients (Cases 12, 13 and 14) during the time the arthritis remained stationary or improved slowly. In Cases 2, 5, 6, 11, 15, 16 and 17 it returned to normal in four weeks. Such rapid falls in sedimentation rates are rarely observed in gonorrheal arthritis with other forms of treatment except in mild cases. With other forms of therapy it frequently remains elevated for three to twelve months. From Table 6 and Chart 3 one notes that the sedimentation rates remained unchanged or were only slightly altered in the 10 cases of rheuma-

Table 6 Results Observed in Patients with Rheumatoid Arthritis During and Following Sulfanilamide Therapy

CASE NO (AGE AND SEX)	DURATION OF JOINT SYMPTOMS	SULFANILAMIDE DAILY DOSE	BLOOD LEVEL	TIME IN RELATION TO FIRST DAY OF THERAPY	TOXIC MANIFESTATIONS	LABORATORY DATA				CNS SUMMARY AND REMARKS
						SEDIMENTATION RATE	LOWEY PLASMA CARBON DIOXIDE COMBINING POWER	uric acid mg per 100 ml	uric acid mg per 100 ml	
19 (48 M)	27 yr	8 (3 days) 6 (1 day) 1 (5 days)	mg %	Before After 96th	Cyanosis vertigo nausea	Not done	Not done	Not done	Not done	Mild typical progressive rheumatoid arthritis and chronic nonspecific prostaticitis. No improvement of joint symptoms during therapy. Arthritis unchanged at the end of a 3 month follow up period.
20 (40 M)	2/3	6 (11 days)		Before After 7th 14th 21st 57th	Cyanosis fever euphoria	1.23	Not done	Not done	Not done	Mild typical rheumatoid arthritis (acute onset). Symmetrical joint involvement. During the first 3 days of therapy joint pain increased. Developed sustained temperature (102.103°F) on fourth day which continued until drug was omitted. Joint pain swelling and stiffness improved. Sixteen weeks later improvement maintained except for minimal stiffness and aching.
21 (32 M)	8	6 (12 days) 2 (12 days)	11.0 + 5.0 +	Before After 14th 21st 30th 56th 84th	Cyanosis	1.62	55.3	100	102	Moderately severe progressive rheumatoid arthritis (typical). Spondylitis with symmetrical joint involvement. No improvement with sulfanilamide therapy. Effusion of the left knee developed during the 3rd week of therapy. Arthritis unchanged during 6-month follow up period.
22 (24 M)	4	6 (14 days) 2 (14 days)	8.0 + 5.0 +	Before After 19th 21st 30th 44th	Cyanosis vertigo	1.43	52.5	99	102	Mild slowly progressive rheumatoid arthritis (typical). Six months prior to entry contracted acute gonorrhea. No improvement of joint symptoms during sulfanilamide therapy. Urethral discharge disappeared 2nd day after therapy started. Effusion of right knee developed during the 3rd week of therapy. A 20-week follow up period showed no change in joint symptoms.
23 (45 M)	5	6 (14 days) 2 (14 days)	12.0 +	Before After 14th 21st 42nd 63rd 77th 82nd	Cyanosis	0.70	43.8	99	109	Mild progressive rheumatoid arthritis (typical) with knee effusion of 4 months duration. Nonspecific prostaticitis. Renal stones. Slight improvement during therapy. A 5½ month follow up period showed condition unchanged. Knee effusion and painful shoulders persisted.
24 (31 M)	1/3	6 (15 days)		Before After 7th 14th 21st 42nd	Cyanosis	Not done	58.5	101		Mild typical rheumatoid arthritis (acute onset). No improvement during sulfanilamide therapy. Joint symptoms unchanged during 16-week follow up period.
25 (37 F)	6	6 (14 days)	5.0 +	Before After 7th 14th 21st 30th 42nd	Cyanosis anemia	1.41	Not done	Not done	Not done	Moderately severe progressive rheumatoid arthritis (typical) with knee effusions for 4 years. No improvement during therapy and unchanged 4 weeks after cessation of sulfanilamide.
26 (20 M)	4	6 (27 days)	6.4 +	Before After 7th 10th 28th 40th 100th	Cyanosis slight anemia	0.75	Not done	Not done	Not done	Moderately severe progressive rheumatoid arthritis (typical) with associated spondylitis. No improvement during or following therapy. Followed 1 month.
30 (31 M)	9	15 (1 day) 8 (8 days)	12.0 +	Before After 14th	Cyanosis fever anorexia nausea rash	0.78	52.3	100	104	Moderately severe slowly progressive rheumatoid arthritis (typical). Symmetrical joint involvement. Knee effusions of over 4 years duration. Drug omitted after nine days because of appearance of a diffuse maculopapular rash. No improvement in arthritis during or following therapy.
31 (57 M)	5/6	12 (1 day) 7 (1 day) 6 (7 days)	10.0 +	Before After 10th	Cyanosis anorexia nausea fever euphoria	0.21 0.18	45.0	99	101	Very mild slowly progressive rheumatoid arthritis (typical). Symmetrical involvement of shoulders wrists and fingers. No improvement during therapy despite continuous temperature of 102.103°F. No change noted during follow up.

toid arthritis except for the previously mentioned Case 22

These data suggest that a rapid fall in the sedimentation rate in gonorrheal arthritis is indicative of a satisfactory clinical response to the dose of sulfanilamide being administered. If the sedimentation rate remains unchanged, this may indicate inadequate dosage, a resistant gonococcal strain or an incorrect diagnosis

#### EFFECT ON THE GENITOURINARY FOCUS

Gonococci were isolated from the genitourinary tract in 13 of the 14 cases of proved gonorrheal arthritis (Table 2). In 12 of these cases there was marked improvement in the genitourinary

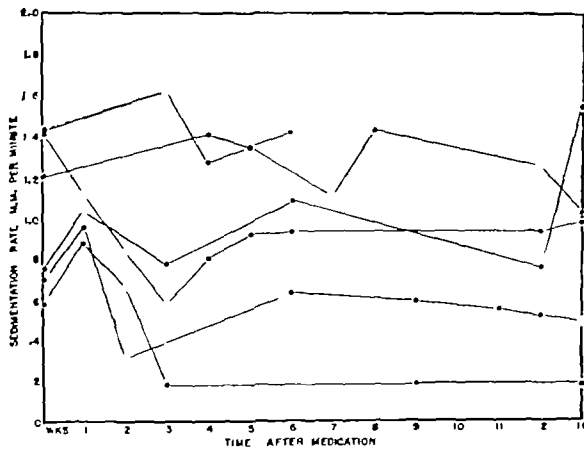


Chart 3 Corrected Sedimentation Rates in Cases of Rheumatoid Arthritis

From this chart one notes that the corrected sedimentation rates of the bloods of patients with rheumatoid arthritis are not altered following the administration of sulfanilamide. The one case in which the sedimentation rate did return to normal (Case 20) developed fever on the fourth day of therapy. It continued between 102 and 103°F during the subsequent eight days.

symptoms and disappearance of the gonococcus after the third day of therapy. Subsequent examinations three to forty-eight weeks after cessation of therapy revealed no clinical or laboratory evidence suggesting a recurrence of the genitourinary infection. In Case 9 the organisms did not disappear from the prostatic secretions until the blood-sulfanilamide level had been raised from 6.5 to 11.5 mg per cent. Gonococci were demonstrable in the prostatic secretions from Case 14 after two periods of large doses of sulfanilamide of seven and fourteen days respectively, during which time the blood-sulfanilamide level varied between 11.7 and 17.4 mg per cent. The genitourinary focus subsequently became negative (Tables 2 and 4). Whether the previous sulfanil-

amide therapy played any part in this cure we are unable to say.

Three additional cases were studied. In 2 the patients had uncomplicated gonorrhea. In 1 there was a complicating ischial bursitis. The case histories are presented in brief because of the ensuing complications.

**Case 27** H. R., a 44-year-old, married woman, entered the hospital because of proved gonorrheal endocervicitis of 2 months' duration. The temperature was normal prior to treatment.

Beginning 1 day after entry the patient received 1.33 gm of sulfanilamide every 4 hours for 2 days, then 0.66 gm every 4 hours for 12 days, and finally 0.44 gm every 4 hours for 10 days. Four hours after giving the second 1.33-gm. dose the blood sulfanilamide level was 12.6 mg per cent. This level was maintained until the dose was reduced to 0.66 gm every 4 hours. On this dosage it varied between 4.1 and 7.4 mg per cent.

Three sets of pelvic smears obtained after the 4th day of therapy were negative for gonococci. There was no clinical evidence of endocervicitis after the 10th day. The gonococcal complement fixation test never became positive. The carbon-dioxide combining power fell to 45.6 vol per cent. The serum chlorides varied between 97 and 109 milliequivalents. The serum bilirubin was 2.5 mg per cent on the 3rd day of treatment. The hematologic changes observed are presented in Table 3.

Cyanosis was present from the 1st day on. During the first 2 days the patient had severe 'seasickness,' frontal headache and diarrhea. From the 5th to the 16th day of therapy the temperature varied from 101 to 103°F (Chart 5).

**Summary** A patient with proved acute gonorrheal endocervicitis made a complete recovery after 24 days of sulfanilamide therapy. During a 4-week follow-up period she remained well, all clinical examinations and laboratory tests being normal.

**Case 28** J. McL., a 21-year-old, single man, entered the hospital because of a proved acute gonorrheal urethritis of 2 days' duration. The temperature was normal during the entire period of observation.

Beginning 1 day after entry the patient received 1.33 gm of sulfanilamide every 4 hours for 14 days. Forty-eight hours after institution of therapy the urethral discharge disappeared completely. Three prostatic smears obtained after the 2nd day were negative for gonococci. The complement fixation test never became positive. No significant hematologic variations occurred. The carbon-dioxide combining power fell to 44.6 vol per cent. The lowest serum chloride was 101 milliequivalents. The serum bilirubin remained unchanged.

Cyanosis was present throughout treatment. On the 14th day the patient developed an acute pharyngitis, fever and a palpable spleen. Twenty-four hours later an enanthem and a faint morbilliform rash appeared. It disappeared 12 hours after discontinuance of the drug. No other toxic symptoms were noted.

**Summary** A patient with acute gonorrheal urethritis made a complete recovery after 14 days of sulfanilamide therapy. During a 2-month follow-up period he has remained cured.

**Case 29** G. M., a 29-year-old single man, contracted gonorrhea 42 days before entry. Seven days later he developed an ischial bursitis. He received 6 gm of sulfanil-

amide per day, resulting in a blood sulfanilamide level of 95 mg per cent. Two days after institution of therapy the urethral discharge ceased and there was marked reduction in the bursal pain and swelling. No gonococci were demonstrable in three prostatic smears obtained after the 3rd day of therapy. The patient was completely symptom-free in 2 weeks.

*Summary* A patient with proved gonorrheal prostatitis and an associated ischial bursitis made a complete recovery after 13 days of sulfanilamide treatment.

Thus it will be seen (Table 2) that in 17 of the 18 cases having a proved genitourinary focus no gonococci were isolated after the third day of treatment. These cases remained clinically cured during the three- to forty-eight-week follow-up periods. The 1 failure (Case 14) has been discussed. In another study undertaken to determine what dose of sulfanilamide will cure the greatest number of patients with gonococcal infections in the shortest period of time, we have encountered 2 cases of acute urethritis which did not respond to sulfanilamide. These patients received the drug for fifty-nine and sixty-nine days respectively. During seven days of this therapy the blood-sulfanilamide level was maintained at between 35 and 40 mg per cent. Until the mode of action of sulfanilamide is known, it is impossible to state whether such failures represent special properties of certain gonococcal strains or failure of response in the host. The results in certain cases suggest that insufficient doses of sulfanilamide may interfere with the subsequent effect of large doses. This important point can be determined only by further study.

#### EFFECT ON GONOCOCCAL COMPLEMENT-FIXATION TEST

The gonococcal complement-fixation tests on the blood serums from the 3 patients having proved gonorrheal arthritis with infected synovial fluids never became positive. In Case 2 the synovial-fluid complement-fixation test was positive. The serums from 11 cases of proved gonorrheal arthritis without infected synovial fluids had positive tests. In 6 of these patients the tests became negative in eighteen weeks (Case 4), ten weeks (Case 5), fourteen weeks (Case 6), five weeks (Case 8) and seven weeks (Cases 12 and 13) after the institution of sulfanilamide therapy. In only 1 (Case 18) of the 4 cases of probable gonorrheal arthritis did the test become negative during the time they were followed. In Case 22, with proved gonorrheal prostatitis and urethritis and rheumatoid arthritis, the test remained positive. It became negative within ten and seven weeks respectively in the 2 patients (Cases 21 and 24) with rheumatoid arthritis and probable gonorrheal prostatitis.

Failure to develop positive complement-fixation tests in Cases 1, 2 and 3 suggests that the patients were cured before sufficient antigen had been absorbed.

It is further seen that the serum complement-fixation test for the gonococcus became negative in 9 of the 18 patients having proved (12 cases) or probable (6 cases) gonococcal infections. The fact that the test became negative in such a large percentage of the cases in so short a period of time is further evidence that clinical cures were obtained. Following fever therapy the complement-fixation tests do not become negative in such a large percentage of the cases. They rarely become negative in less than three months' time, and frequently remain positive for as long as six or eighteen months.<sup>3</sup>

#### TOXIC MANIFESTATIONS OBSERVED DURING SULFANILAMIDE THERAPY

During sulfanilamide administration many toxic symptoms appeared. The commonest complaints were vertigo, drowsiness, headache, euphoria, irritability, weakness, nausea, anorexia and at times slight mental confusion. Many patients described their discomfort as being similar to seasickness. Obvious dyspnea was usually present. In no case were these symptoms indicative of serious complications.

*Cyanosis* A varying degree of cyanosis is observed in all patients receiving large doses of sulfanilamide. It is apparent within the first twenty-four hours after the drug is instituted, and disappears rapidly after it is discontinued. In view of the fact that it has been shown that the oxygen capacity of the blood is not diminished, the cyanosis cannot be considered a contraindication to the continuance of therapy.<sup>37</sup> Hartmann et al.<sup>38, 39</sup> report that the cyanosis disappears if 15 mg of a 10 per cent aqueous solution of methylene blue per kilogram of body weight is given intravenously. They further report that it can be prevented if methylene blue is administered by mouth with each dose of sulfanilamide.

This finding and the demonstration of methemoglobin values as high as 13 mg per cent in patients receiving sulfanilamide have led Hartmann and his associates to conclude that the cyanosis is due to methemoglobin. Other workers<sup>2, 40-44</sup> have reported that the cyanosis is due to either sulfhemoglobin or methemoglobin in the circulating erythrocytes. Posner and his co-workers<sup>45</sup> suggest that such methemoglobin is unstable, thus accounting for the inability to demonstrate regularly its presence in the blood of "sulfanilamide-cyanotic" patients. Marshall and Walzl<sup>37</sup> were able to demonstrate its presence in

the blood of only 1 of 3 patients whose hemoglobin as measured by oxygen capacity corresponded with the theoretical value obtained from the total iron content of the blood. They therefore concluded that methemoglobin plays an insignificant role in the production of the cyanosis. They and others<sup>46</sup> suggest that the erythrocytes, which appear brown even after the blood has been thoroughly aerated, are stained by a pigment formed from sulfanilamide. More recently the same suggestion has been made by Ottenberg and Fox<sup>47</sup> on the basis of experiments in vitro. They demonstrated the development of a violet color when clear solutions of sulfanilamide (10 to 20 mg per cent) were irradiated. When such a solution was added to plasma, the violet color disappeared and the erythrocytes became brown as they do in patients receiving sulfanilamide. These authors venture the supposition that the same violet pigment is made in vivo during the metabolism of sulfanilamide and that it accounts for the cyanosis. There is, however, no actual evidence for such a theory. Further work is necessary before the exact cause of the cyanosis can be stated.

*"Acidosis"* Since the original report of Southworth,<sup>34</sup> most writers have noted a reduction in the plasma carbon-dioxide combining power. We have observed similar changes. Often the values obtained were within the normal range, but in every case the premedication values were higher than those obtained during therapy. The lowest serum carbon-dioxide combining power observed was 41 vol per cent (Case 12). The average reduction observed was 10 vol per cent. This reduction of the carbon-dioxide combining power occurred even though the patients received amounts of sodium bicarbonate equal to the sulfanilamide dosage.

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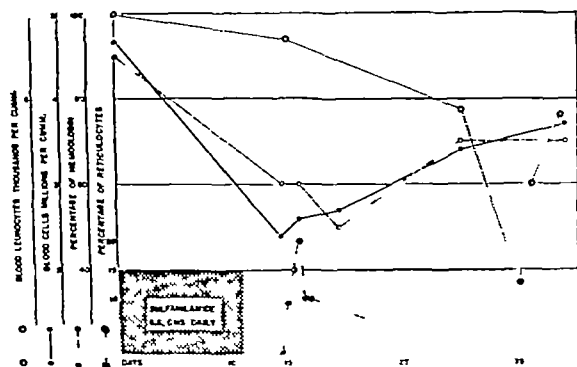


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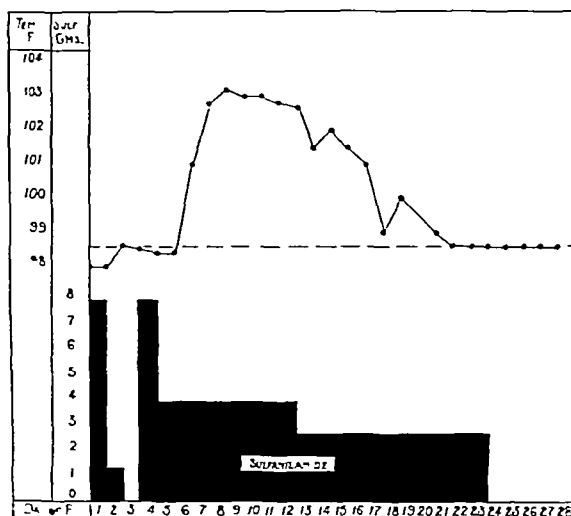


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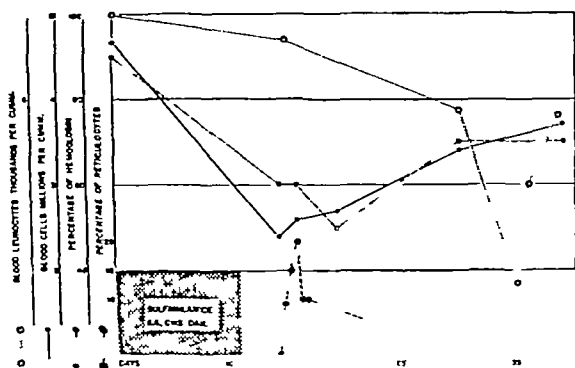


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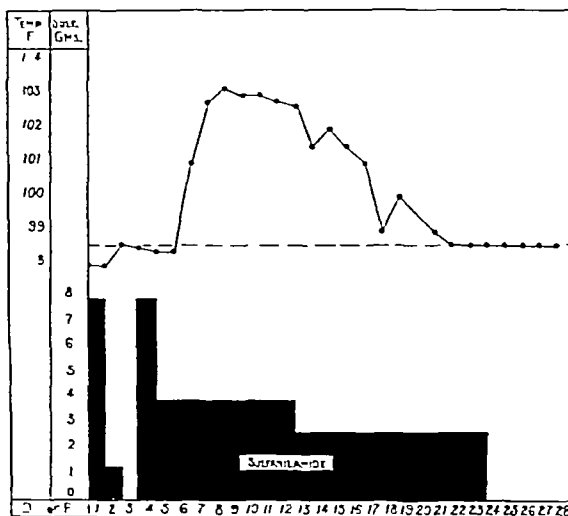


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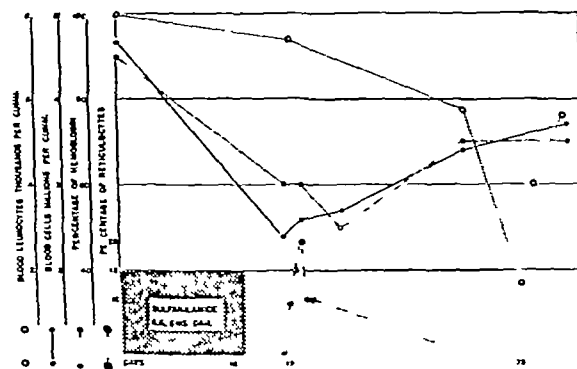


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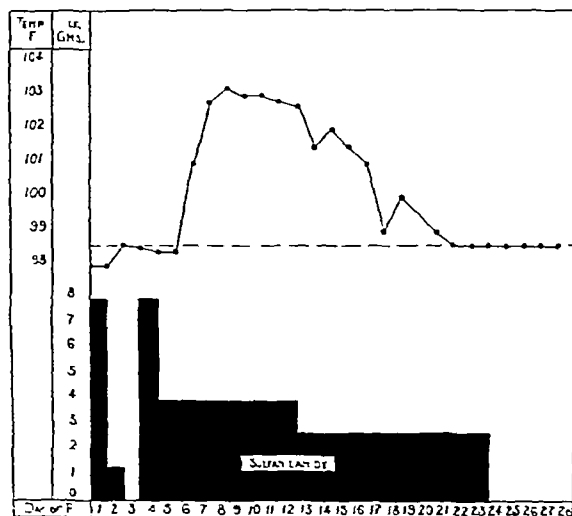


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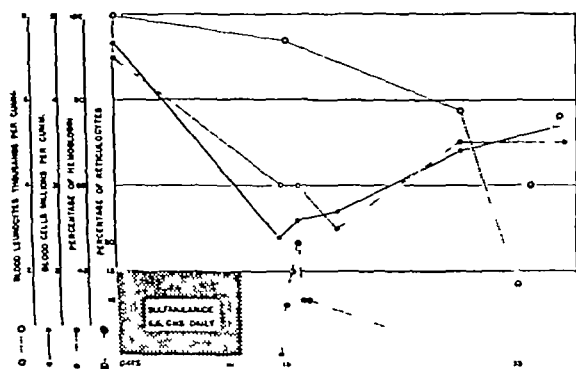


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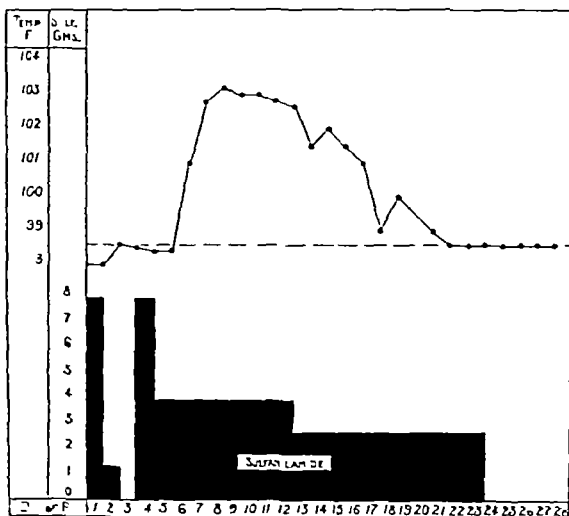


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the fourth day and continued at 102 or 103°F until the drug was discontinued on the twelfth day. Such febrile responses have been observed by others,<sup>3 14 64 65</sup> and are thought to represent a specific reaction to the drug. Therefore the persistence of fever without clinical evidence of infection should always lead one to suspect that it is due to sulfanilamide. If such is the case, omission of the drug should result in subsidence of the fever.

**Skin Reactions** In Cases 20 and 30 a morbilliform rash developed on the fourteenth day of therapy. There was an associated fever, cervical adenopathy, enanthem of the pharyngeal walls, and a palpable spleen. The rash faded twelve hours after discontinuance of sulfanilamide. A much more marked rash was observed in Case 30. Similar skin eruptions have been described.<sup>3 64-72</sup> They appear during the first or second week of therapy, and disappear twenty-four to forty-eight hours after discontinuance of sulfanilamide.

One patient (Case 5), following exposure to sunlight, developed an erythredema of one side of the face and the dorsal surfaces of the hands and wrists. This reaction disappeared five days later, even though the dosage of sulfanilamide remained unchanged. Previous reports have called attention to similar skin reactions following exposure to sunlight.<sup>66 68 71</sup> Because of this risk, it would seem unwise to allow patients receiving sulfanilamide to expose themselves to the direct rays of the sun.

Two patients (Cases 11 and 18) developed generalized urticaria on the tenth day of therapy, in each case it disappeared three days after the omission of sulfanilamide. In Case 18 there was a similar experience three weeks prior to entry, after the giving of 5 gr. of sulfanilamide four times a day for twenty-one days.

Such skin manifestations do not represent serious complications, and require no treatment other than discontinuance of sulfanilamide therapy. The manner of their production is as yet not understood.

#### MODE OF ACTION OF SULFANILAMIDE

The exact mode of action of sulfanilamide in bacterial infections has not been established. Keefer<sup>6</sup> states that the blood of patients with gonococcal infections becomes bacteriocidal as well as bacteriostatic following the administration of sulfanilamide for a few days. Further studies of this type must be undertaken. That sulfanilamide when administered in large doses has a specific effect on the gonococcus is well demonstrated by the data herein presented.

Similar observations concerning the action of

sulfanilamide in streptococcal infections have been made. At the present time it is impossible to say whether or not its dramatic clinical results are due solely to the slightly increased bacteriocidal effect. It is apparent, however, that sulfanilamide therapy offers a method of approach to the study of the conditions responsible for the healing of infectious diseases.

#### DISCUSSION

From the results obtained in this group of patients it appears that if the highest percentage of clinical cures is to be obtained, sulfanilamide should be administered in large doses. A constant fluid intake should be maintained. It is extremely important that one sixth of the total calculated dose be given every four hours, day and night, if constant blood-sulfanilamide levels are to be maintained throughout each twenty-four-hour period. This method of administration will maintain levels varying from 5 to 10 mg per cent. If this dose is to be therapeutically effective, definite evidence of improvement should be apparent within forty-eight to seventy-two hours. Those cases that do not experience immediate improvement will not be affected by sulfanilamide therapy until the dose is increased. From our experience this group tends to run lower blood-sulfanilamide levels (5.0 to 7.5 mg per cent). If this is found to be the case, administration of one third the total calculated dose at two successive four-hour periods, followed by one sixth the calculated twenty-four hour dose every four hours, will usually suffice to raise the blood-sulfanilamide level above 10 mg per cent. Such blood levels may prove to be therapeutically effective when the lower levels are seemingly ineffective. Further studies may eventually prove that the highest percentage of cures will be obtained in those patients whose blood-sulfanilamide level is kept at or above 10 mg per cent.

Despite the fact that striking clinical improvement and sterilization of infected synovial fluids may occur as early as forty-eight to seventy-two hours after institution of sulfanilamide therapy, we have in most cases administered large doses for a period of two weeks or longer in order to obtain the largest possible number of clinical cures. Recent experience suggests that large doses for short periods of time, seven days or less, may suffice. Further studies, however, are necessary in order to establish with certainty that shorter periods of therapy and smaller doses will allow for the same percentage of clinical cures as we have observed. That small doses (10 to 15 gr. three or four times a day, during the day only) may not effect clinical cures is well illustrated by

the 4 patients (Cases 12, 13, 14 and 18) who were so treated prior to hospital entry. The data from these cases further suggest that small doses may increase the resistance of the gonococcus to subsequent sulfanilamide therapy.

Shorter periods of therapy with large doses might aid materially in reducing the frequency of the various toxic manifestations. These, however, except for the rare cases of agranulocytosis, do not represent serious complications, providing they are watched for and recognized early in order that appropriate treatment may be instituted at once. In most cases discontinuance of sulfanilamide and the forcing of fluids (5000 cc. the first day) will suffice. In the case of severe anemias, leukopenia or agranulocytosis, transfusions may be necessary. Frequent urinalyses and serum non-protein nitrogens—and phenolsulfonephthalein and urine-concentration tests in some cases—have failed to reveal any evidence of renal impairment or irritation following the use of this drug. No evidence of hepatic impairment was noted in any of the cases so studied. In the rare cases with renal impairment requiring sulfanilamide therapy the amount of the drug required must be established by frequent blood-sulfanilamide determinations. In such cases one should aim for a level of 10 mg per cent.

From our experience in treating gonorrheal arthritis it is obvious that the best end results will be obtained in cases where therapy is instituted before joint destruction has occurred. It is unreasonable to expect prompt and complete subsidence of the soft-tissue inflammatory changes, removal of the fibrosed tissue and restoration of destroyed joint surfaces encountered in the subacute and chronic cases of gonorrheal arthritis. It is quite amazing to witness the restoration to normal of a case of severe acute gonorrheal arthritis so soon after the administration of sulfanilamide. From our data it appears that a gonococcal focus of long duration responds as promptly as does one of short duration. Further study of a large group of patients having infected synovial fluids is necessary in order to establish what percentage can be cured with large doses of sulfanilamide. From the results observed we do not claim that all cases of gonorrhea will be cured, but we believe that early diagnosis and treatment with large amounts of the drug will undoubtedly give the best results.

The specific value of any therapeutic measure can be established only if one is able to demonstrate that the clinical course of the disease is strikingly altered in a large percentage of cases. The results herein reported, as well as those of other workers, indicate clearly the effect of sulfanilamide on gonorrheal arthritis. We have

never observed this prompt arrest and subsidence of the inflammatory changes, including joint pain, to take place so regularly with other therapeutic measures, including fever therapy. This quick response of an active gonorrheal arthritis is of itself sufficient to allow one to conclude that sulfanilamide exerts a specific chemotherapeutic effect on the gonococcus.

Additional studies must be undertaken in order to establish (1) the amount of sulfanilamide necessary to cure the majority of the patients with gonorrheal infections, (2) the length of time the drug should be administered, (3) the dose required for those patients who do not respond to the usual dosage, (4) the length of time the drug should be continued in the absence of clinical improvement, (5) whether insufficient initial doses influence the efficacy of larger doses given subsequently, (6) whether some strains of gonococci are sulfanilamide-resistant, and (7) what role the immunologic response of the host plays in the therapeutic effectiveness of sulfanilamide. The answers to such questions will not only increase the usefulness of sulfanilamide therapy, but also will add to our general knowledge concerning the healing of infectious diseases.

#### SUMMARY

From the results obtained in treating 14 cases of proved and 4 of probable gonorrheal arthritis, 2 cases of gonorrhea, and 2 cases of proved and 2 of probable gonococcal prostatitis, the following conclusions seem justified:

Sulfanilamide administered in large doses for two or more weeks appears to be a specific chemotherapeutic agent for certain strains of gonococci because

1. Infected synovial fluids can be sterilized in forty-eight to seventy-two hours after institution of therapy.
2. In 17 of the 18 cases having a proved genitourinary focus, no gonococci were found after the third day of treatment. These cases remained clinically cured during the follow-up periods.
3. The gonococcal complement-fixation test failed to become positive in 3 cases of gonorrheal arthritis with infected synovial fluids. In 9 of the remaining 18 cases the complement-fixation test became negative.
4. Nine of the proved and 2 of the probable cases of gonorrheal arthritis showed striking clinical improvement in forty-eight to seventy-two hours after institution of therapy.

- 5 The end results in the 14 proved and the 4 probable cases of gonorrheal arthritis were more satisfactory and took place in shorter periods of time than occurs with other forms of therapy

The toxic manifestations resulting from the administration of large doses of sulfanilamide are readily recognized. They do not represent serious complications (except for the hematologic changes), and respond promptly to discontinuance of the drug.

A slow, progressive, sub-clinical hemolytic anemia occurred in 13 of the 28 patients. Leukopenia was observed in 2 cases.

The erythrocyte sedimentation rates fell rapidly in the cases of gonorrheal arthritis showing striking and immediate relief.

The largest percentage of clinical cures will be obtained in patients with gonococcal infections if sulfanilamide in doses sufficient to maintain a blood-sulfanilamide level of 10 mg per cent or higher for seven or more days is administered early.

The clinical course of rheumatoid arthritis is not affected by large doses of sulfanilamide. The erythrocyte sedimentation rate remained unchanged in 9 of the 10 cases treated.

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## PEPTIC ULCER CONSIDERED FROM A SURGICAL POINT OF VIEW\*

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THE treatment of patients with peptic ulcer has undergone profound changes since twenty years ago. At that time most physicians, influenced by the enthusiasm of surgeons of an earlier day whose brilliant results with gastroenterostomy had enabled Moynihan<sup>1</sup> to say, "No operation in surgery has produced more striking or swifter results," considered peptic ulcer to be a surgical disease which responded satisfactorily to this form of treatment. Not many years elapsed, however, before other surgical procedures were recommended, for it was soon demonstrated that gastrojejunostomy should not be employed as a routine procedure. Plastic operations on the pylorus, such as the pyloroplasty of Finney and the gastroduodenostomy of Wilkie, gained favor, but after more extensive experience, these too were found to have definite disadvantages. Later, resection of the pylorus and finally subtotal resection of the stomach were developed.

Coincidentally with these changes in surgical procedure, the medical treatment of peptic ulcer developed, so that the management of a high proportion of cases without surgical intervention is now entirely satisfactory. Consequently the treatment of this disease has come to be considered more commonly a medical problem and less frequently a surgical one. In the Massachusetts General Hospital such patients are now followed in a combined medical and surgical clinic.

All these changes in treatment have been reflected in the cases treated at this hospital. Through study of the records of about 2700 cases

of peptic ulcer treated here during the last fifteen years, we have reached definite conclusions with respect to the proper surgical treatment of this disease. The indications and types of surgery that have been employed are summarized in the accompanying tables.

The end results of all cases treated by surgery prior to 1923 were appraised by Fremont-Smith and McIver<sup>2</sup> in 1929. At that time, gastroenterostomy was employed as a specific measure. They found that approximately 80 per cent of patients were relieved by this operation. It is of interest that nearly 80 per cent of all ulcer patients seen in this hospital in the fifteen years since 1923 were relieved by medical means (Table 1). It seems

Table 1 *Type of Treatment Received at the Massachusetts General Hospital (1922-1936) by 2726 Patients with Duodenal Ulcer*

YEARS	MEDICALLY TREATED CASES			PERCENTAGE		SURGICALLY TREATED CASES	
	O	P	D			NUMBER	PERCENTAGE
	NUMBER						
	House						
1922-1926	440	250	699	76.8		211	23.2
1927-1931	322	377	699	80.5		170	19.5
1932-1936	259	481	740	78.2		207	21.8
Totals	2138			78.4		588	21.6

entirely possible that the 20 per cent of patients now not rendered symptom-free by medical measures would not have been helped by gastroenterostomy in earlier years.

Within the last fifteen years the percentage of patients requiring surgical treatment has averaged close to 20. The most important evidence presented in Table 1 is that peptic ulcer has come to be regarded as a disease that should be appraised critically in the hospital wards rather

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than be treated solely in the Out Patient Department, as was the case in earlier years

It is convenient to classify the cases which come to require operation according to the following indications: acute perforation, cicatricial obstruction, profuse bleeding and pain intractable to medical treatment. Although the total number of cases requiring surgery has not changed, a glance at Table 2 will show that the number of patients

Table 2 *Indications for Operation in the 588 Patients with Duodenal Ulcer*

YEARS	INDICATIONS				
	ACUTE PERFORATION	CICATRICIAL OBSTRUCTION	PROFUSE BLEEDING	INTRACTABLE PAIN	MISCELLANEOUS
1922-1926	32	67	6	101	5
1927-1931	55	59	6	45	5
1932-1936	56	67	24	42	18
Totals	143	193	36	188	28
Percentages of grand total	24.3	32.8	6.1	31.9	4.7

operated on for different indications has been greatly modified. Thus in late years the number of patients operated on for so-called intractable pain has diminished by 50 per cent. On the other hand, the significance of massive bleeding as an indication for surgery has been appreciated only recently, and the number of operations for this complication has increased.

#### ACUTE PERFORATION

It is well established that patients with acute perforation of a peptic ulcer should be operated on without delay. There are a few with small perforations which become walled off spontaneously, either by omentum or by a neighboring viscus, who will survive without operation. The selection of such cases is too difficult at present, and in case of doubt patients should be given a better chance for recovery by early surgical intervention.

The surgery in nearly every case need include no more than simple closure of the perforation. This may be done by placing sutures in normal tissue on either side of the ulcer in such a manner that constriction is avoided, and tying them together. Often this method is impossible because of the size of the ulcer, and it is necessary to use an omental tab to cover the perforation, holding it there by loosely tied sutures passed through the edges of the ulcer. This procedure is highly recommended by Roscoe Graham<sup>3</sup>. He has used it with such success that we are inclined to employ it in all perforations. Constriction of the duodenum rarely occurs when this is done. In any event, it must be recognized that while the pylorus may seem to be obstructed, most of the swelling is due to edema, and a superimposed gastrojejunostomy

for relief of the obstruction is very rarely indicated. An attempt to cure the ulcer by means of gastrojejunostomy, pyloroplasty or partial gastrectomy at the time of suture of the perforation is generally considered unjustifiable. Not only are these operations often unsatisfactory, but they add a considerably increased hazard to an already precarious condition. Furthermore, it must be remembered that many patients are cured by the fibrosis of the ulcer which follows perforation and suture.

#### CICATRICIAL OBSTRUCTION

Obstruction of the pylorus due to peptic ulcer may be produced either by edema due to an active ulcer or by fibrosis and contraction about the pylorus. The distinction is not always easy to make, but is exceedingly important as a means of determining proper treatment. The acute ulcer is usually characterized by the occurrence of typical ulcer pain, in addition to the vomiting characteristic of obstruction. Prompt relief usually follows decompression of the stomach with a Levine tube, a proper diet and the administration of belladonna. Operation is contraindicated in these cases, if it can possibly be avoided, because the extensive periduodenal inflammation prevents any direct attack on the ulcer. If operation cannot be avoided and there is excessive reaction around the duodenum, a conservative operation such as gastroduodenostomy is indicated, in the hope that later a subtotal gastrectomy may be safely done.

On the other hand, there is a large group of patients with pyloric obstruction due to the formation of dense scar tissue, to whom the administration of anti-spasmodics brings no relief. This condition may develop in young patients, but is much commoner in older ones. It is usually associated with low gastric acidity. Gastroenterostomy in this group usually results in complete relief from symptoms, for the simple mechanical problem of pyloric obstruction is answered, and there is practically no danger of late gastrojejunal ulcer.

#### PROFUSE BLEEDING

Two distinct problems are encountered in this group of cases. One is presented by patients who enter the hospital bleeding profusely, the other by those who have had one or more severe hemorrhages but are in good physical condition at entry.

Treatment of profuse bleeding must be considered without delay. It has been shown from a study of the Massachusetts General Hospital cases by Allen<sup>4</sup> that death occurs in one third of such patients who are fifty years of age or over, but in slightly less than 5 per cent of those under that

age This difference we attribute to the sclerosis of the eroded vessels in older patients, on account of which thrombosis is accomplished with much more difficulty than in younger ones

It has also been shown conclusively by Finsterer,<sup>5</sup> and in a small series of cases at the Massachusetts General Hospital,<sup>6</sup> that operation performed more than forty-eight hours after onset of the hemorrhage carries an excessively high mortality On the other hand, if resection can be done within forty-eight hours there is little more risk than with an ordinary resection Certainly the mortality will be less in the older age group if they are operated on than if they are allowed to bleed Younger patients should be treated conservatively, with operation reserved for a later date

This leads us to a consideration of the patient who has had one or more massive hemorrhages but is admitted with a quiescent ulcer There is great variation of opinion on this subject Jordan and Kiefer<sup>7</sup> have shown that such patients are kept symptom-free with extreme difficulty, 40 per cent failing to get relief from medical measures after one hemorrhage, and 85 per cent after two This group, then, merges with our fourth group of ulcers unresponsive to medical care which require operation

We conclude from a study of our cases that one massive hemorrhage is an indication for operation in patients over fifty A single hemorrhage in the younger group demands a careful medical regime If ulcer symptoms persist, or if a second massive hemorrhage occurs, operation is indicated

The type of operation to be employed depends on the presence or absence of acute bleeding A method of approach useful in dealing with acute massive hemorrhage has been described by Allen,<sup>8</sup> in it bleeding is controlled by the finger, while all vessels leading into the ulcer are ligated in normal tissues If the operation is performed after the subsidence of the acute hemorrhage, a subtotal resection of the stomach should be done If possible the ulcer should be resected, if not, the vessels supplying it should be ligated The earlier procedure of gastroenterostomy for massive bleeding has been found to be unsatisfactory

#### PAIN INTRACTABLE TO MEDICAL TREATMENT

Although medical treatment of peptic ulcer is much more satisfactory than it was formerly, a certain number of patients still fail to respond to it Some have persistent pain despite the fact that they are supervised carefully in the hospital Others improve in the hospital but have a recurrence of symptoms soon after they leave, owing to an unhappy home environment or to excessive

business worries Some find it impossible to continue the proper medical diet outside the hospital Most of these patients have repeated hospital admissions, surgical intervention finally becoming necessary

The number of patients classed as intractable to medical treatment is less than half what it was fifteen years ago In the early years of our survey, posterior gastroenterostomy was employed as a routine operative treatment Quite obviously many of the successful gastroenterostomies in this group in early years were performed on patients who now might be kept comfortable without surgery On the other hand, the patients at present classed as intractable comprise one of the most serious challenges to the gastric surgeon, it is here that the poor results of gastroenterostomy are found Duodenal ulcers on the posterior wall and associated with bleeding, deeply penetrating lesions, multiple ulcers, gastric ulcers that do not decrease in size under treatment, those with an extensive gastritis and those with a high gastric acidity, all demand more than a palliative short-circuiting operation for relief

The operative procedures heretofore employed in this group of patients are numerous, gastroenterostomy was long the most popular (Table 3)

Table 3 *Type of Operation in the 224 Patients with Duodenal Ulcer Who Were Operated on Because of Intractable Pain or Massive Bleeding*

YEARS	TYPE OF OPERATION		
	POSTERIOR GASTROENTEROSTOMY	RESECT- TION	OTHER OPERATIONS
1922 1926	87	6	14
1927 1931	37	8	6
1932 1936	20	39	7

Stomal ulcer with its attendant high mortality has occurred so frequently that this operation must be considered entirely unsatisfactory Pyloroplasty has not been employed in many patients in this series, but where it has been, only temporary relief has often been obtained Pylorotomy fails to remove much of the acid-bearing portion of the stomach, and it too has proved unsatisfactory The only procedure that we have found gives relief to a large percentage of these patients is subtotal gastrectomy in which approximately three fifths of the stomach is removed This is in accordance with the conclusions of many other surgeons, including Finsterer,<sup>5</sup> Berg,<sup>3</sup> Lewisohn,<sup>9</sup> Ogilvie,<sup>10</sup> Marshall and Kiefer<sup>11</sup> and Graham<sup>12</sup> If it is impossible because of technical difficulties to resect the stomach, Finsterer's "resection for exclusion" may be employed, this is often required in deeply penetrating ulcers of the posterior wall

The details of subtotal gastrectomy vary considerably with different surgeons We believe

that this variation is not of great moment. While an adequate follow-up study of such cases cannot be obtained for many years after operation, we know that the patients treated in this manner have furnished exceedingly satisfactory end results. Subtotal gastrectomy following failure of more conservative operations has been required so frequently that we now carry it out as the primary pro-

cedure, and is occasionally required by an episode of massive bleeding. Thorough medical treatment is indicated in all other cases. Patients who develop cicatricial obstruction do well with gastroenterostomy. Those who develop ulcers which are intractable to medical care or have been associated with massive hemorrhage should receive subtotal gastrectomy.

Table 4 *Fatalities in 67 Private Patients Who Had Gastric Resections Performed for Peptic Ulcer (exclusive of those operated on late for massive hemorrhage)*

LOCATION OF ULCER	NO OF CASES	DEATHS
Duodenal ulcer	50	2
Gastric ulcer	10	1
Gastrojejunal ulcer and gastrojejunal fistulas	7	0

cedure in a great majority of cases. When it is properly performed on patients in the best possible physical condition, the operative mortality is extremely low (Table 4).

#### SUMMARY

The treatment of peptic ulcer has changed markedly in the last twenty years. Prompt surgery is demanded in patients who develop acute perfora-

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## SYPHILITIC HEPATITIS WITH JAUNDICE\*

### Report of a Case

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**SYPHILITIC** hepatitis with jaundice is an uncommon complication of luetic infections. It occurs in about 1 per cent of cases of early syphilis, and is usually of mild degree. In the secondary stage it is extremely rare but moderately severe. In the tertiary stage it occurs seldom, being reported by McCrae 46 times in 3300 autopsies at the Johns Hopkins Hospital. Thompson has stated that the liver is probably involved in all constitutional syphilis.

Painless afebrile jaundice in a patient with a positive blood test for syphilis presents a clinical problem that is not easy to evaluate. In essence, one must give thought to the various disease entities which may cause this type of jaundice in order to determine whether one or more diseases are present. In making a final diagnosis the past history, present illness, physical examination and all relevant tests must be considered together, no single clinical or laboratory finding is pathogno-

monic of the cause of jaundice. The question of choice between medical and surgical treatment is often a serious one. Even though the x-ray report of a cholecystogram in such a case is "pathologic gall bladder," this does not necessarily indicate that surgery is the proper treatment.

Most physicians are familiar with the modern accepted methods of anti-syphilitic therapy. To treat a patient who has syphilitic jaundice with arsenic requires a reasonable understanding of pathology and clinical medicine, because, as is well known, this alone may cause jaundice. However, fire sometimes has to be fought with fire, and such a result is no reflection on this method of treatment. All such treatment carries a risk which is relatively very slight, and is accepted by both physician and patient as being far less than that of omitting it.

Most textbooks and articles advise against such treatment. Thompson, Power and Murphy, Osler and McCrae, and others state without qualification that arsphenamine should not be used in the treatment of late syphilitic hepatitis with jaundice.

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Stokes, Wile, O'Leary and a few others assert that the contraindication is relative and not absolute. All authorities agree that potassium iodide should be tried first, but most of them recommend that mercury or bismuth be given next, before trying arsenicals. However, arsenic can be used successfully in the treatment of this type of jaundice, as has been reported by O'Leary, Stokes, Wile, and others, and is demonstrated by the following case

#### CASE REPORT

The patient, a 50-year-old, unmarried laboratory technician, was first seen in February, 1935. He complained of afebrile, painless jaundice of 5 weeks' duration. The past history was significant in that he had had rheumatism 15 years previously, the attack began with a sudden onset of sharp pain in the right heel and there were pains in various joints. The patient was in bed for 9 weeks, since then he had had mild rheumatic pains, especially during cold, damp weather, otherwise his general health had been good. He was referred to the New England Deaconess Hospital for study.

The present illness began 6 weeks before admission, when the patient had a moderate 'soreness in the bones', this increased and soon became constant, day and night. At the end of 1 week he quit his work because of loss of strength, after resting at home for 2 weeks he stayed in bed because several joints had become swollen and very painful. Five weeks later his appetite became poor and his strength was quickly depleted on slight exertion. At this time he noticed that his urine was dark. The following day he became jaundiced. He had had no abdominal pain and no complaints which were referable to the gastrointestinal tract. He had lost 10 pounds since the onset of his illness, whereas there had been no previous loss of weight. He had received no medication except aspirin and an alkaline powder, these gave no relief.

Physical examination showed universal deep jaundice and inability to sit up without aid on account of painful joints, practically all the joints were tender, and there was moderate swelling of the knees and wrists. The lungs showed rales at the right base, but were otherwise normal. The heart sounds were regular, the rate was 80 and there were no murmurs. The blood pressure was 120/80. The abdomen showed no tenderness, masses or spasm, the liver was not palpable. The pupils and other reflexes were normal. The other findings were not remarkable.

X-ray photographs were taken of the spine, joints of the extremities, chest and gastrointestinal tract, and intravenous cholangiograms were made. The films revealed a pathologic gall bladder and periosteal proliferation along the internal and posterior aspects of the right ulna, otherwise they were negative.

Laboratory tests showed normal red-cell and white-cell counts, an icteric index of 35 and a blood bilirubin content of 2.1 mg per cent. Blood Wassermann, Hinton and Kahn reactions were positive on repeated tests. The spinal fluid contained 2 cells per cubic millimeter, the Wassermann reaction was doubtful on the first test and possibly positive on the second. The stools were negative for bile. The gastric contents were negative.

It was apparent that the patient had syphilis and possibly gall-bladder disease. At first it was not clear how much and what kind of treatment he should receive. He was given potassium iodide at once. A surgical consulta-

tion was requested, and the patient was seen by Dr. Leland S. McKittrick and by Dr. Elliott C. Cutler. They agreed that in view of all the findings surgery was not indicated. Anti-syphilitic medication was continued, this consisted of potassium iodide and protiodide of mercury given orally, the latter being alternated each week with quinine iodobismuth given intramuscularly.

After 4 weeks in the hospital the patient's condition gradually became worse. At this time he had a severe chill and the temperature fell to 96°F. He developed a diffuse bronchitis, heard over the left chest, and complained of severe pain in both sides of the back, the latter being caused by bilateral pleurisy. There was also severe sub-sternal discomfort, and angina-like pain over the precordia. The blood pressure at this time varied from 75/65 to 110/80, the heart sounds were regular and of fairly good quality. The patient developed auricular fibrillation, which subsided within 48 hours following the use of large doses of morphine and complete digitalization. During the 5th week the patient was no better, the mercury and bismuth were omitted at this time. It seemed reasonable to try arsenic, and 0.1 gm. of neoarsphenamine was therefore administered intravenously, no ill effects were noted. Three days later 0.2 gm. of the same drug was given, after which improvement began. Four days later 0.25 gm. was given. The dosage was gradually increased every 4 days to a maximum of 0.45 gm. From this time on, treatments were given at weekly intervals.

From the 6th to the 10th week the general condition improved. The rales in the lungs gradually subsided and the jaundice disappeared, the patient's appetite returned and his strength increased. In the first part of the 3rd month there was a transient recurrence of auricular fibrillation and edema of the feet. The blood pressure gradually returned to a normal level of 130/80, and the heart continued regular, 0.1 gm. of digitalis was given daily. Ten weeks after admission the patient was able to sit in a chair and walk a little, and was discharged to his home.

During the last 3 years potassium iodide has been given continuously, as well as fifty-six doses of intravenous and intramuscular medication consisting of neoarsphenamine, Mapharsen and quinine iodobismuth, between these doses protiodide of mercury has been given orally. A few months after leaving the hospital the patient developed hypertension, which has persisted to the date of writing at levels of 160/80 to 180/110. He has taken digitalis 0.1 gm. each day. Cardiac decompensation has not recurred. The blood Hinton reaction continued positive during the 1st year, was negative for a short time in the 2nd year and is positive at the present time, although the patient feels very well and presents no special symptoms.

#### CONCLUSION

The experience of others, together with the results in this case, demonstrates that some patients having syphilitic hepatitis with jaundice can be successfully treated with arsenicals. However, no general rule can be formulated as to which cases may be so treated.

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## A NOTE ON DRAINAGE OF THE PREVESICAL SPACE\*

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IN MOST suprapubic operations on the bladder the prevesical space or space of Retzius is opened. Practically all urinary surgeons appreciate the importance of drainage of this region, and

there is not much discharge, and then withdrawing it a little at a time. Undesirable consequences not infrequently follow when a drain is removed either prematurely or all at once.

Owing to the fascia covering the muscles that form the urogenital pelvic diaphragm, there is no way for the prevesical space to drain dependently, infection therefore tends to remain there, and its spread is promoted because of the loose, fatty tissue which the space contains. Thus it is that premature or precipitate withdrawal of the drain may leave behind a poorly drained septic pocket. This often results in a dirty and slowly healing wound, or even the formation of a slow abscess, which eventually extends by the path of least resistance, namely upward behind the pubic bone to the lower end of the suprapubic wound. Massive pericystic suppuration or periostitis or osteomyelitis of the pubic bone may occur, but fortunately these serious complications are rare.

Two of my cases emphasize the importance of such drainage.

### CASE REPORTS

**Case 1** The patient, an 84 year-old man, underwent a two-stage suprapubic prostatectomy. A few days after the first stage the drain in the prevesical space was completely removed at one sitting by the intern. There seemed to be no ill effect, except that for some days afterward there was considerable edema of the penis, of probable significance in view of the later events. Two weeks after the first operation the second was done, the prostate being removed through the sinus created by the large suprapubic tube. The wound healed well, but there was abnormal tenderness below the lower end of the wound and a slight fever every evening. Little importance was attached to these sequelae, and since the patient was very anxious to go home he was discharged from the hospital. A few weeks later his doctor telephoned that the lower end of the wound had become very painful, and had finally broken open and discharged a large amount of pus, but no urine. The doctor was advised to open the prevesical space widely and drain it thoroughly for a long time. This was done, and the patient never had any more trouble.

**Case 2** The patient, a 64 year-old man, underwent a one stage suprapubic prostatectomy. Two days after operation, while the hemostatic bag was being removed

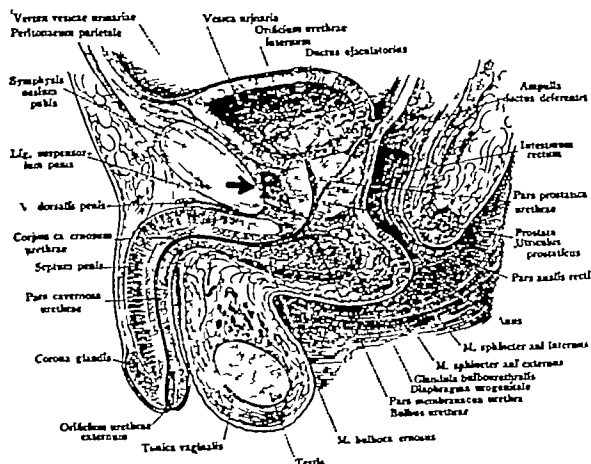


Figure 1 Median Sagittal Section through the Male Pelvic Organs

This drawing shows how the anatomy of the prevesical space marked P, makes infection tend to pocket there once it has gained access. Due to the fascia covering the urogenital pelvic diaphragm below, the pubic symphysis in front, and the prostate and bladder behind and above this space has very poor natural drainage. There are two paths which extension of infection in this space may take. The first one is laterally on either side around the base of the bladder as far back as the iliac vessels, but this is rather uncommon. The other and commonest path is upward behind the pubic bone keeping anterior to the peritoneal cavity, to the abdominal wall and the lower end of the suprapubic wound, whence the original infection came. (Reproduced from Eycleshymer and Jones's *Hand Atlas of Clinical Anatomy*, by permission of the authors and of the publishers, Lea and Febiger, Philadelphia.)

leave a soft drain down behind the pubic symphysis after every suprapubic operation. However, some surgeons do not realize the importance of leaving the drain in place for a number of days, until the temperature has returned to normal and

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through the suprapubic wound, the drain in the prevesical space caught on the bag and was pulled out with it. The patient's general condition was excellent, but although the suprapubic wound quickly became free of urine it was slow in clearing up and healing. Eventually, however, it healed completely. Two months later the patient began to complain of pain and swelling under the lower end of the suprapubic wound. A fluctuant bulge was opened, a quantity of thick pus was evacuated and a drain was put down in the septic prevesical space. Eventually the wound healed permanently.

In both the cases reported it is evident that the prevesical space became infected at operation, was insufficiently drained and became walled off. After

the infection had smouldered there for some weeks an abscess formed, and extended upward along the path of least resistance to the suprapubic region.

The lesson to be learned from these cases is that the prevesical drain inserted after a suprapubic operation on the bladder should not be removed prematurely or all at one time. Its withdrawal should not be started until five or six days have elapsed and the temperature has returned to normal, and the drain should then be shortened a little at a time.

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## REPORT ON MEDICAL PROGRESS

### STREPTOCOCCAL DISEASE\*

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THERE is no denying the fact that hemolytic streptococcal infections are among the commonest of acute infections and cause, in one way or another, a high percentage of the ill-

Table 1 *Hemolytic Streptococcal Groups*

GROUP	DISEASE	OTHER SOURCES
A	Human infections. Scarlet fever Puerperal sepsis Rheumatic fever activity Streptococcal pneumonia	Human nasopharynx and hands Cow's milk
B	Bovine mastitis due to <i>Streptococcus agalactiae</i> Human infections (rare) Arthritis Puerperal sepsis	Human throat and vagina
C	Equine strangles and endometritis Bovine mastitis Guinea pig adenitis Human infections (rare) Erysipelas	Human throat, vagina and skin
D	No human infections (?) Endocarditis (?)	Human bowel and vagina Cheese
E	No human infections	Cow's milk
F	No human infections (?) Glomerulonephritis (?)	Human throat and feces
G	No human infections (?) Canine infections	Human throat and vagina Monkey's throat
H	No human infections	Human throat and feces
I	No human infections	Human throat

ness in any community. It has been ascertained by the United States Public Health Service in a survey of the respiratory infections that hemolytic streptococcal infections are responsible for at least 5 per cent of the measurable illness and about 20

per cent of all the respiratory diseases. This does not include the cases of acute rheumatic fever or acute nephritis which are initiated by an infection of this type.

The normal habitat of the hemolytic streptococcus is in the lymphadenoid tissue of the throat. It does not grow freely on the surface of the mucous membranes but is found in the crypts of the tonsils and in the lymphoid tissue itself. About 30 or 40 per cent of normal individuals carry hemolytic streptococci in their throats at some time during the course of the different seasons of the year, the incidence being highest in the winter and early spring months. The presence of hemolytic streptococci in the human throat may be a transitory phenomenon, or they may be found over long periods of time without causing disease. Carriers are commoner in individuals who are in contact with patients with acute streptococcal infection of the throat, and such contacts are especially liable to become carriers if they have a common cold. Moreover, those who are carriers can spread organisms much easier when they have a cold. For these reasons, anyone with a cold should avoid individuals who have active streptococcal disease, and a carrier with a cold should be careful so that he does not spread infection to other individuals.

In any study of hemolytic streptococcal infection, one will find the following groups: (1) transient carriers, (2) permanent carriers, (3) patients with sub-clinical infection, and (4) patients with clinical infection. To be of any significance it must be determined that the streptococci a carrier harbors in his throat belong to Group A.

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### SEROLOGICAL GROUPS AND TYPES OF HEMOLYTIC STREPTOCOCCI

Hemolytic streptococci have been divided and classified according to serological methods into nine groups<sup>1</sup> These, together with the diseases with which they are associated and with their sources, are summarized in Table 1

In general it can be said that in so far as man is concerned the vast majority of all infections are due to Group A This group, in turn, has been divided into twenty-six serological types, but since there has been very little study of such types in the United States, the percentage distribution of various types cannot be stated at the present time It is true, however, that evidence is lacking to show that the various diseases caused by hemolytic streptococci are produced by any single spe-

Table 2 *Structure of Hemolytic Streptococcus Group A*

COMPONENTS	CAPABLE OF PRODUCING ANTIGENIC RESPONSE	REMARKS
Whole organism	Yes	
M substance (protein)	No (haptene)	Type specific
C substance (carbohydrate)	No (haptene)	Group specific
Nucleoprotein	Yes	Not species specific over laps with pneumococci and other organisms
Erythrogenic toxin (A and B)	Yes	Neutralized by antitoxin
Hemolysin	Yes	
Fibrinolysin	No	
Leucocidin	?	

cific type For example, Griffith<sup>2</sup> has isolated twenty-three specific types from cases of scarlet fever and of sore throat This is a subject that requires further study and investigation

### THE ANTIGENIC STRUCTURE OF HEMOLYTIC STREPTOCOCCI

The antigenic structure of human, virulent, Group A hemolytic streptococci is exceedingly complex, and our information concerning it very incomplete. However, a number of various constituents have been isolated and studied They are summarized in Table 2

### IMMUNITY TO HEMOLYTIC STREPTOCOCCI

So far as is known, hemolytic streptococci are destroyed in the body by means of intracellular digestion This is greatly facilitated by the presence of specific antibody and complement, which favors and accelerates phagocytosis There are also good grounds for believing that the macrophage and histiocyte are of greater importance in the destruction of the hemolytic streptococcus than the polymorphonuclear cells Aside from the immune mechanism which actually destroys the organism, there are other immune bodies that

develop during the course of disease These immune substances neutralize substances produced by streptococci, such as erythrogenic toxin, hemolysin and fibrinolysin, which cause deleterious effects in the body These antibodies limit the damage done to cells and aid in the localization and fixation of organisms in the tissues

### THE TREATMENT OF HEMOLYTIC STREPTOCOCCAL INFECTIONS

Within the last few years there have been a number of advances in the treatment of various hemolytic streptococcal infections The most important is the use of sulfanilamide Other methods of treatment, such as immune transfusion, antitoxic treatment and the use of streptococcal filtrates in the treatment of recurrent erysipelas, merit consideration

*Sulfanilamide* There is no longer any doubt that sulfanilamide is the best chemotherapeutic agent so far developed for the treatment of streptococcal infections In a word, it can be said that this drug has a bacteriostatic (growth-limiting) effect on all strains of human virulent hemolytic streptococci, and for some strains there is evidence that it actually has a bactericidal (killing) effect on small numbers of organisms It is most effective when antibody is present in the circulating blood, and it appears that the main function of the drug is to slow up the growth of organisms and keep the infection from progressing too rapidly until the normal defense mechanism of the body develops to the stage where there is a positive balance of antibody In other words, recovery from streptococcal infection following sulfanilamide therapy appears to be due to at least two conditions first, it is necessary to subject the organisms to a concentration of the chemical that produces maximal bacteriostasis, and, secondly, the body must retain or acquire the power to rid itself of the viable organisms that are producing the disease In order to produce maximal bacteriostasis it is necessary to give sufficient amounts of the drug so that the concentration in the blood is at least 10 mg per 100 cc Antibody is often provided by means of immune-blood transfusions

The most striking results from sulfanilamide treatment have been obtained in hemolytic streptococcal meningitis, bacteremia, puerperal sepsis, cellulitis, erysipelas, chronic empyema, osteomyelitis and chronic leg ulcer Less impressive results are reported in scarlet fever and acute tonsillitis, and there is insufficient information available concerning its value in hemolytic streptococcal pneumonia There is some suggestive evidence that its use reduces the number of cases



of otitis media and mastoiditis following tonsillitis and scarlet fever, but on this more information is necessary before a decision can be reached. In any event, there are good grounds for using this drug in all cases of hemolytic streptococcal infections.

*Immune-Blood Transfusion* Several years ago, Lyons<sup>3</sup> recommended the more frequent use or immune-blood transfusions in the treatment of streptococcal infections, especially in cases with bacteremia. The purpose of this method of treatment is to provide antibody which will aid in clearing the blood of organisms and in promoting the localization of the infection. In order that the proper donor may be selected it is necessary to establish that the donor's blood is compatible and that his blood plasma contains antibody which promotes phagocytosis of the patient's organisms. This method has the disadvantage that it requires a trained person to carry out the phagocytosis test, furthermore, in most cases it is necessary to examine a number of donors before a suitable one is found. Nevertheless, it is the best method that is available at present for supplying specific antibody to patients with hemolytic streptococcal infections.

*Antitoxic Therapy* Streptococcus antitoxin is capable of neutralizing the erythrogenic and hemolytic toxins of the organism. In some diseases, such as scarlet fever, the erythrogenic toxin is responsible for the eruption and many of the symptoms and signs of intoxication. For this reason, the use of large amounts of antitoxin early in the course of the disease is often followed by the disappearance of the rash, a sharp drop in the temperature and the amelioration of many of the signs of intoxication. Blake<sup>4</sup> has recently stressed the importance of early treatment with antitoxin in adequate doses—20,000 to 40,000 units, depending on the severity of the case. When this is carried out in cases of scarlet fever, the duration of the disease is shortened, and the course of the disease changed. In view of the frequency of serum sickness, antitoxin should probably be reserved for severe cases of scarlet fever. Antitoxin in erysipelas, puerperal sepsis and other infections has been employed with varying degrees of success. There is no doubt, however, that many of the symptoms of these diseases may be relieved. The antitoxic serum is not curative and one should not expect it to be so, since the effects of the toxin are only a part of the disease process. Nevertheless toxic symptoms add to the patient's difficulties and can be neutralized by the antitoxin, so that the latter should be used in patients with severe signs of intoxication.

*The Treatment of Recurrent Erysipelas* One

of the outstanding features of erysipelas is its tendency to recur in the same individual. The usual course of events is to observe two attacks coming on within several weeks of one another, but there are numerous instances in which patients may have frequent attacks occurring over a period of months or years. These recurrent attacks may involve the face or the extremities.

While the mechanism for the production of these recurrent attacks is not absolutely clear, there is suggestive evidence that, as a result of a previous hemolytic streptococcal infection which has caused erysipelas, the skin of the involved area becomes sensitized and highly susceptible to the products of the hemolytic streptococcus, so that the presence of hemolytic streptococci in the tissues in small numbers can cause a very acute reaction. In recurrent erysipelas of the face, one can frequently find hemolytic streptococci or staphylococci in the nasal discharge, and often there is evidence of a chronic nasal sinusitis due to these organisms (Stevens<sup>5</sup>). In the case of recurrent erysipelas of the legs, it has been demonstrated by Amoss<sup>6</sup> that hemolytic streptococci invade the tissues from small breaks in the skin that are so often present in epidermophytosis.

It is also known that one does not need hemolytic streptococci in the area of acute inflammation to produce an acute attack of erysipelas, since a recurrent attack can be produced in susceptible individuals by injecting toxic filtrates of hemolytic streptococci into the subcutaneous tissues. For example, if an individual is subject to recurrent erysipelas of the face, an attack can often be produced by injecting a small amount of sterile toxic filtrate into the subcutaneous tissues of the arm. This indicates that the toxic products of the hemolytic streptococci or staphylococci are capable of producing the reaction in susceptible areas of the skin. Naturally in the course of the recurrent attacks there must be a focus of infection in some area from which toxic products are absorbed.

The treatment of recurrent attacks of erysipelas, then, consists of (1) elimination of the foci of infection, such as chronic nasal sinusitis, and the proper care of the feet, and (2) repeated injections of the patient with the products of the hemolytic streptococcus or staphylococcus. To obtain satisfactory results it is necessary to use both of these methods of treatment.

The treatment is carried out as follows<sup>5</sup>. Hemolytic streptococci and staphylococci are obtained by culturing the nasal discharge. These organisms should be grown in proteose-peptone broth in an atmosphere of carbon dioxide for several days. The culture should then be passed through

a Berkefeld filter, and the filtrate tested for sterility. Subcutaneous injections with the filtrate should be made twice a week, starting with 0.1 cc of a 1:200 dilution and increasing the amount until 1 or 2 cc of undiluted filtrate can be tolerated. During these injections a critical dose is often reached, usually between 0.1 and 0.2 cc of undiluted filtrate, which is followed by swelling of the face or other affected parts. If this amount is reduced the reaction does not recur, and one can then increase the dose gradually so that finally 1 or 2 cc of undiluted filtrate is tolerated. If the patient can tolerate this amount of undiluted filtrate and if the focus of infection has been removed, the recurrent attacks usually cease. This form of treatment is most satisfactory in a high percentage of cases of recurrent erysipelas or so-called infectious edema of the face.

\* \* \*

Unfortunately there is no effective method of treatment of subacute bacterial endocarditis due to *Streptococcus viridans*. There are isolated cases in which the blood has been temporarily sterilized following the use of sulfanilamide, and rare cases have been observed in which long remissions and the complete absence of symptoms for as long as eighteen months have occurred follow-

ing the use of the drug. The chief difficulty in the effective treatment of subacute bacterial endocarditis is attacking and destroying the organisms at their source in the heart valves. If one were able to destroy the vegetations so that the organisms would no longer be protected from the action of specific antibodies and leukocytes, the question of recovery would appear to be relatively easy. Very often the blood is sterilized, but the organisms continue to grow in the vegetations and to leave the focus from time to time so that the signs of active infection progress, regardless of a high antibody titer in the blood. This disease remains a challenge to medical investigation, and to effect a cure it appears likely that some method must be devised that destroys the vegetations on the heart valves.

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CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25031

## PRESENTATION OF CASE

*First Admission* A fifty-year-old, married Greek laborer was admitted because of a discharging sinus over the dorsal spine.

Eight months before entry a small painless swelling appeared on his back between the shoulders in the midline, which he thought was a boil. It remained unchanged after poulticing, and he consulted a physician, who said that it was a cyst and advised removal. After removal the wound healed perfectly within ten days. A few weeks later a second swelling appeared lower down opposite the angle of the scapula and to the right of the midline. This time at an outside hospital a 15 cm operative incision was made which healed well except for a small sinus opposite the ninth thoracic vertebra. The sinus remained open up to the time of entry and on two or three occasions discharged a small piece of bone. He had felt well and had no other complaints.

For many years he had been a night watchman and later an elevator operator. He was born in Greece but had been in Massachusetts for thirty-two years, although he had returned to the "old country" three times during this period. Since childhood he had had "lumps" in his neck.

Physical examination showed a well-developed and nourished man in no distress. There was a small, healed, non-tender scar on the back of the neck in the midline. At the top of the scar there was a small 5 mm nodule. Just to the left of the scar, a larger nodule was noted, which was hard, non-tender and freely movable. A 15 cm scar was present to the right of the midline, extending from the thoracic to the upper lumbar region. In the center of the scar was a very small, non-tender draining sinus. Except for a few carious lower teeth, he was edentulous. Examination of the neck showed a mass 3 by 3 cm just below the angle of the left jaw, medial to the sternomastoid; it was firm, non-fluctuant, freely movable and non-tender. Examination of the chest was negative. The blood pressure was 138 systolic, 80 diastolic. The abdomen showed bilateral inguinal hernias.

The temperature was 98.8°F, the pulse 100, the respirations 28.

The urine examination was negative. The blood showed a red-cell count of 3,600,000 with 65 per cent hemoglobin, and a white-cell count of 7000 with 65 per cent polymorphonuclears, 28 per cent lymphocytes, 4 per cent mononuclears and 3 per cent eosinophils. A blood Wassermann test was negative.

X-ray films of the spine showed a rounded area of diminished density in the right transverse process of the fifth dorsal vertebra and slight irregularity in the adjoining portion of the rib. The medial portion of the sixth rib in the region of the tuberosity showed increased density and was somewhat irregular in outline. Lipiodol injected into the draining sinus communicated with the area of destruction in the rib. Chest films showed old calcified tuberculosis at each apex.

On the eleventh hospital day he was discharged to his local physician with a diagnosis of chronic osteomyelitis.

*Second Admission* (four years later) Five months after discharge the patient returned for examination, at which time the sinus had healed. There was good mobility of the spine, and no pain. He was well until three weeks before readmission when the pain recurred in the midline of his back at the site of the old operation. It was aggravated by motion. Four days later he noted a swelling, which became very tender, to the right of the midline on his upper back. He had had no chills or increased perspiration.

Physical examination showed a cervicodorsal kyphosis. There was a tender fluctuant area on the back 3 cm in width to the right of the midline, extending from the first to the fifth dorsal vertebra. Two small, round, hard nodules were present on the back of the neck just to the left of the midline opposite the fourth and seventh cervical vertebrae.

Examination of the urine was negative. The blood showed a red-cell count of 4,200,000 with 70 per cent hemoglobin, and a white-cell count of 8900.

X-ray films showed a definite variation from normal in the third, fourth and fifth dorsal vertebrae. The joint spaces were hazy and narrow. The heads and necks of the fifth, sixth and seventh ribs showed marked irregularity and contained areas of bone formation and destruction.

On the day of admission an incision was made into the fluctuant area, and 180 cc of thick, yellow pus was evacuated. The abscess cavity seemed to run upward beneath the muscles over the right shoulder. On the thirteenth hospital day the

wound showed good granulation and the patient was discharged

*Third Admission* (seven years later) One year before, he entered the surgical clinic for removal of a "wen" on the right side of his back, which had been present for six years

He had enjoyed excellent general health until one month prior to his final entry when his urinary stream decreased to a dribble. At the same time constipation increased. One week later he noted numbness and weakness in his legs. He was able to obtain relief at first by vigorous exercise, but this soon became impossible. One week before entry he was unable to stand. At this time he also noted a large mass in the suprapubic region and had a desire to urinate. When he was assisted to his feet he became incontinent to the extent of dribbling. Since then he had not been able to void.

Physical examination showed a depressed scar over the two upper dorsal vertebrae 3 to 4 cm in depth, in addition to his other scars. Three small movable nodules were present below some matted nodules in the right posterior triangle of the neck. Chest and abdominal examinations were negative except for palpation of the liver edge 2 cm below the costal margin. The edge was sharp and non-tender. Rectal examination revealed a lax sphincter. The prostate was small, firm and non-tender. The spinous processes of the seventh cervical and first dorsal vertebrae were absent. There was decreased response to all forms of sensory stimuli below the level of the fourth dorsal nerve anteriorly and posteriorly. A spastic paraplegia was present, with the left leg weaker than the right. The knee and ankle jerks were markedly hyperactive, and there was a positive Babinski sign on both sides.

The temperature was 99°F, the pulse 80, the respirations 20.

Examination of the urine showed many clumps of white cells and a rare hyaline cast. No Bence-Jones protein was found. The blood showed a red-cell count of 4,190,000 with 77 per cent hemoglobin, and a white-cell count of 9350 with 70 per cent polymorphonuclears, 24 per cent lymphocytes, 1 per cent mononuclears, 1 per cent eosinophils and 4 per cent basophils. The serum non-protein nitrogen was 29 mg per cent, the protein 8.2 gm. A blood Hinton test was negative. A lumbar puncture showed an initial pressure of 130 mm of water, but combined jugular pressure gave no response. Abdominal pressure caused a rise to 350 mm. The spinal fluid was clear but xanthochromic. It contained 1 lymphocyte per cubic millimeter. The total protein was 378 mg

per cent. The goldsol was 0444333110, the Wassermann negative.

X-ray films of the chest showed mottled areas of dullness in both apical lung fields, especially on the right, with multiple areas of calcification. There were also areas of calcification in both middle lung fields and the soft tissues of the neck. The dorsal spine showed hypertrophic changes. There was no evidence of metastatic cancer. There was partial destruction of the right side of the third dorsal vertebra, with absence of the pedicle in this area. The adjacent portion of the third rib was destroyed. There were cyst-like areas in the medial portions of the second, sixth and seventh ribs and in the fifth, sixth and seventh transverse processes on the right. No deformity of the vertebrae was present which could explain a paraplegia. There was evidence of Paget's disease of the ilium and sacrum on the left side. The skull was negative.

During the first ten days in the hospital the compression damage to the cord gradually increased, and on the tenth day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. ALFRED O. LUDWIG. Apparently there had been some change in the x-ray of the spine at the time of his second entry, as it was beginning to show more involvement of the ribs. May we see the films?

DR. AUBREY O. HAMPTON. The x-ray films taken at the time of the first admission are not here. The films that we have show obvious disease in the spine and ribs. The process has extensively involved at least half the dorsal vertebrae, and the ribs adjacent to these vertebrae are surrounded by a fair-sized soft-tissue mass simulating an abscess. The abscess, if it is one, is surprisingly small for so much disease in the vertebra if it were due, let us say, to tuberculosis.

DR. LUDWIG. Is it not unusual for tuberculosis to cause this much destruction without collapse of the vertebrae?

DR. HAMPTON. Yes, and the joint spaces of these vertebrae are narrowed but not moth-eaten and irregular as you would expect. There may be destruction in the third dorsal vertebra, but since we cannot see it in the lateral view, we have no proof of it.

DR. LUDWIG. How about other types of infection, osteomyelitis of the spine, for instance?

DR. HAMPTON. I do not understand this appearance in the rib. It looks like an expansive lesion on first glance, but I do not believe the rib is actually enlarged. That is the cystic area described, a very curious thing.

DR. LUDWIG The pictures do not suggest myeloma?

DR. HAMPTON No, I do not believe it is a tumor. It is probably an infection. The only thing that makes me think of tuberculosis is the calcification in the region, some of it, however, may be in the lung and some in the supraclavicular glands, instead of around the spine.

DR. LUDWIG Do these findings suggest an actinomycotic infection of the bones of the spine? From what I am able to gather this disease does destroy ribs and transverse processes.

DR. HAMPTON I think that actinomycosis would be more liable to cause complete destruction in the primary area, with gradual spread instead of spotty destruction such as we have here. The infection in this case skips two ribs and then shows destruction of one at each end of the areas. It is a very unusual picture by x-ray, and I do not know what it is.

DR. LUDWIG Is there anything to suggest an actinomycotic infection?

DR. HAMPTON No.

DR. TRACY B. MALLORY How about infection caused by the typhoid bacillus?

DR. HAMPTON Any infection could produce this picture.

DR. LUDWIG I thought I was going to get more help from the x-ray than I did.

To go back to the beginning of this case, it seems to me the first statement we have that might be of some importance is that this man of fifty had had lumps in his neck since childhood. I am inclined to interpret them as being a manifestation of cervical tuberculous adenopathy which existed during childhood but which was inactive at the time of hospitalization. He apparently had pulmonary tuberculosis at some time, with healing and calcification in the region of the old lesion. His recent trouble dates back to eight months before the first entry, then the process went on for eleven years before his last admission here. The most outstanding symptoms were tenderness and constant stiffness in the upper part of the spine, with rather marked pain, nodular swelling and sinus and eventually abscess formation. On the second admission, a very large abscess was found, which contained 180 cc of pus. Interestingly enough there were few constitutional signs, very little temperature or pulse increase, not very much increase in the white count, very moderate anemia and little weight loss. Then we come to his last admission and another new neurologic symptom. As to the diagnosis of the underlying disease one has to think of tuberculosis, but according to Dr. Hampton's interpretation and from what I know of the x-ray findings in tuberculosis of the spine,

these are certainly not the ordinary findings of that condition. From what I am able to discover one sees such changes in actinomycosis, and this disease can produce extensive destruction of the spine without collapse of the vertebrae. However, actinomycosis and blastomycosis are diseases of relatively short duration, — a year or two at the most, — and this has gone on for eleven years.

His final episode is obviously due to compression of his cord, but there seems to be no evidence from the x-ray that such compression is due to a collapsed vertebra.

DR. HAMPTON I should have mentioned the possibility that he has a secondary infection superimposed on a tuberculous abscess.

DR. LUDWIG I think it is probably true that when draining sinuses appear in such a case they are almost invariably due to secondary infection. There is one note in the history of a sequestrum's being discharged from a sinus. So far as actinomycosis or blastomycosis is concerned sequestrums are usually absent because large pieces of bone become necrotic. That also holds true of tuberculosis. The spinal-fluid findings, including the gold-sol curve, are characteristic of block, and I believe his neurologic findings are due to extradural abscess formation, with compression of the cord. The serum protein of 8.2 per cent is interesting. Except dehydration I know of only one condition that can cause such a deviation, namely multiple myelomas. I do not know whether it is increased in other types of bone tumors or in amyloid disease, which this man might well have had. He had a liver which seemed to have increased in size at the last entry, when it was found to be 2 cm below the costal margin. It could not be felt before — at least it was not mentioned. He had none of the other findings of amyloid disease, neither the kidney changes usually giving the picture of nephrosis nor an enlarged spleen. There was only a single determination of the protein so that I am not inclined to place too much importance on that finding. Furthermore, the x-ray findings are not those of multiple myelomas. In this disease there is usually far more anemia than he had and the bone lesions are more often multiple, rather than localized to one small area. Apparently they found Paget's disease in the pelvis on the right side, but I do not see how that could have had anything to do with the situation.

I shall stick to a diagnosis of an infectious process involving the spine, that is, an osteomyelitis, which I do not believe was due to tuberculosis. I do not know what the infectious agent was. Had it been actinomycosis the patient would not have lived so long as he did, and the typical sulfur

granules should have been found. I think the neurologic symptoms of compression of the cord were due to extradural abscess formation, secondary to the infection of the bones of the spine. He had Paget's disease, which I do not believe plays any essential part in the symptomatology.

DR MALLORY: Are there any suggestions?

DR WILLIAM J MIXTER: There is a chance that the patient may have had a perfectly normal space for fluid to pass up and down around the spinal cord without compression of the cord and that the symptoms were the result of a transverse myelitis due to infection.

A PHYSICIAN: Could the spinal-fluid picture be produced by venous thrombosis?

DR MIXTER: Yes.

A PHYSICIAN: With tremendous increase of blood supply and no place for it to go?

DR MIXTER: I think so, more probably thrombosis, either arterial or venous, without cord compression. I should guess that it was chronic non-tuberculous osteomyelitis, or a secondary process to an original tuberculous focus.

DR JAMES C WHITE: As soon as we came down to the posterior surface of the lamina the diagnosis became apparent. Numerous cysts of varied size had worked their way out between the laminae and lay between the bone and muscles. We had thought of the possibility of echinococcus disease, because this man was a Greek, but had not pursued the suggestion. We had also asked about the "wen" that had been removed. He said it was a wen, but in retrospect it is likely that it was an echinococcus cyst. As we cut down through the bone, it was soft and there were a great many cysts between the bone and the dura. There was definite compression of the cord. Furthermore, there was erosion in the pedicles which opened into a large cavity in the extrapleural tissues on the right side. Just how big this area was, I do not know.

#### CLINICAL DIAGNOSIS

Inflammatory compression of the spinal cord

DR LUDWIG'S DIAGNOSES

Osteomyelitis of vertebrae and ribs, with paravertebral abscess and sinus formation

Extradural abscess

Compression of the spinal cord

Paget's disease

#### ANATOMICAL DIAGNOSIS

Echinococcus cysts involving vertebrae, extradural space and extrapleural tissues

#### PATHOLOGICAL DISCUSSION

DR MALLORY: I imagine that this was the only Greek who was ever in the hospital on whom an echinococcus complement fixation test was not done. Of course it should have been done. The cyst was very typical and contained daughter cysts and numerous hooklets. There is no question that some of the cysts were secondarily infected, and probably the original draining sinus developed in this way.

DR LUDWIG: There is no evidence that there was cystic disease anywhere else? How about the lungs?

DR MALLORY: I think in retrospect the lungs were probably involved.

DR HAMPTON: I do not believe I have ever seen a cyst in the bone like that.

DR MALLORY: We know very little about such lesions. Before seeing this case, we did not appreciate that bone could be involved, but in looking the matter up in Kaufmann's textbook, we discovered that involvement of the spine is not uncommon.

DR THORNTON SCOTT: Coley\* reported two cases in 1932.

DR WHITE: Dr George W. Van Gorder had a case where the hip bone was involved.

DR HAMPTON: We have seen it involving bone secondarily but not as a primary cyst in the bone.

DR MALLORY: The echinococcus test was done afterward and was positive.

#### CASE 25032

##### PRESENTATION OF CASE

A six-month-old infant boy entered the hospital for treatment of a cold, running nose and fever of thirty-eight hours' duration.

The child had been well until the morning of the day before entry, when he seemed tired and listless and for the first time in his life had a running nose. That afternoon he vomited on four occasions, bringing up lavender-colored material. A physician was called who found his temperature to be 101°F and made a diagnosis of a "cold in the chest." The child slept well that night and did not seem to be feverish. He refused his milk but drank some water. The following morning he was very drowsy, although at intervals he became fairly alert. He continued to take water but still refused milk. In the middle of the afternoon his mother gave him an enema because his bowels had not moved for twenty-four hours. A hard stool was obtained, followed immediately by a gush of bright red blood. The blood was

Coley B. L.: Echinococcus disease of bone: report of two cases involving the pelvic girdle. *J. Bone & Joint Surg.* 14:577-580, 1932.

estimated to be enough to fill a small wine glass. A physician was called and found the child's temperature to be 102°F. He said the child's neck was stiff and advised immediate hospitalization. He was brought into the Emergency Ward that evening. During his illness he had not shown difficulty in respiration and had had no twitchings, convulsions or vomiting, except as noted above.

He had been delivered normally at full term and had apparently steadily gained weight since birth. He had had no previous illnesses. He had six siblings who were living and well. One sibling had died in a "convulsion" at the age of eleven months, and one had died of 'suffocation' at the age of six weeks.

Physical examination revealed a well-developed and well-nourished, extremely sick, pale, somewhat cyanotic infant who was too ill to resist attempts at examination. There was slightly diminished resonance over the right chest, with a tendency to bronchial breathing but no rales. The heart was negative. The abdomen was very much distended, with absent peristalsis, it had a doughy consistence and was tympanitic throughout. There was no spasm, and no masses were palpable. There was a bright-red, bloody discharge from the anus, and on rectal examination the examining finger seemed to reach an indefinite mass which slipped away from it.

The temperature was 102.6°F., the pulse 160, the respirations 52.

The blood showed a white-cell count of 14,300. An x-ray film showed no evidence of disease in the chest. There was a large amount of gas in the small intestine, all the loops being slightly dilated, however, there was not marked dilatation of a single loop. In the right lower quadrant there was a beak-like deformity with narrowing at one end.

A laparotomy was performed a few hours after entry.

#### DIFFERENTIAL DIAGNOSIS

DR. LEO B. BURGIN. At the outset we may say confidently that this infant had an acute upper respiratory infection. The nasal discharge, fever and white count are typical. The vomiting may likewise be considered consistent. Infants frequently manifest the presence of infection anywhere in the body by vomiting. Can we attach any significance to the lavender vomitus? It is certainly not blood. Could this represent some foreign material that the infant ingested? Probably not. Such a color might conceivably be due to a reaction between iodine present in frequently used nose-drops (iodine, camphor and menthol)

and undigested starch in the stomach. I shall pass it by. The anorexia and drowsiness that occurred during the subsequent twenty-four hours could go very well with the respiratory infection.

At the end of this time a new symptom made its appearance—melena. In determining the source of melena, the nature of the blood as it appears on the outside—that is, whether it is clotted and whether it is pure blood or an admixture with fecal material or mucus—is important. In this instance it is reported as being bright-red blood. Can we tie this up with the respiratory infection? Parenteral diarrheas are not uncommonly seen with respiratory infections. However, we should expect loose watery stools, mucus and, in the case of enteric diarrhea or colitis, pus. This is not the case here. We shall have to look to other causes for an explanation.

Duodenal ulcers occasionally occur, particularly in young infants. Blood, when present, is usually tarry in nature and as a rule well mixed with fecal material, rarely is bright-red blood seen. The vomitus would very likely be described as coffee-grounds or frankly bloody. The peritoneal reaction that was present—distention and a doughy abdomen—and the critical appearance of the infant could suggest perforation. However, most of the findings point to a lesion considerably lower in the gastrointestinal tract.

Henoch's purpura can give bleeding of various types, particularly if the bleeding points be widely separated. In such a case, we might have a combination of tarry stools and bright-red blood. The abdominal findings could be the result of extensive intestinal hemorrhage. However, we should expect to find mention of the typical, associated, purpuric lesions of the skin. Bleeding due to blood dyscrasia of one sort or another or to hemophilia does not appear likely from the history. Congenital telangiectasia involving the gastrointestinal tract might be considered as a possibility. But this is quite rare and usually associated with microscopic bleeding occurring over a long period of time and leading to marked secondary anemia and with a familial history. There is no evidence for it here.

A bleeding rectal polyp could explain some of the findings. The suggestive mass that slips away on rectal examination might represent such a polyp. It should be accessible to proctoscopic examination and would probably be associated with tenesmus and an appreciable outpouring of mucus from the rectal mucosa. This was not the case.

We are left with the consideration of two possibilities: bleeding from a peptic ulcer in a Meckel's diverticulum and intussusception. There are a

number of features which favor either of these diagnoses. The age and sex of this patient are consistent with a diagnosis of intussusception. Usually the previous health is described as good. As in this case, an upper respiratory infection may initiate the intussusception. However, no mention is made of pain which is usually characteristic, coming in bouts as each peristaltic wave tends to push the invaginated intestine onward. On one occasion I saw an eleven-month-old, stoic Chinese infant who had other signs of intussusception but gave no history of pain. The sausage-shaped tumor of intussusception is not described here. The indefinite mass felt by rectum could conceivably be the apex of the intussusception. The doughy consistence of the abdomen, the distention and the absent peristalsis might be due to obstruction and peritoneal reaction attending early gangrene, although the elapsed time was shorter than that usually necessary for such a process to take place. Furthermore, there is no mention of the "currant-jelly" mixture of blood and mucus that is so typical of the disorder, unless we assume that the "bright-red bloody discharge" is a veiled description of such a finding. The clinical signs in the chest could easily have been due to abdominal distention. This was confirmed by subsequent x-ray examination.

We then come to a consideration of Meckel's diverticulum. The symptomatology varies according to whether there is obstruction, inflammation or ulceration, or a combination of these. Bleeding is usually associated with ulceration resulting from the acid secretions of ectopic gastric mucosa in the diverticulum. The bleeding may vary from simple streaks of blood, with or without admixture of fecal material, to frank gross hemorrhage. The bleeding is not attended with any great amount of pain. The diverticulum may be the source of an intussusception. In this event the symptoms of intussusception predominate. The other abdominal findings—doughy abdomen, distention, absent peristalsis, and so forth—may represent evidence of peritonitis due to perforation. In infants with peritonitis a doughy abdomen may be found rather than the typical board-like abdomen. However, this consistence of the abdomen might be due to

a large internal hemorrhage. The absence of pain is not of itself an objection to a diagnosis of perforation. Pain is an unreliable symptom in infancy. The x-ray report referring to a "beak-like deformity" in the right lower quadrant I do not comprehend. It does suggest something going on in an area consistent with the location of a Meckel's diverticulum, and I believe that the latter is the diagnosis. There may have been a perforation.

#### PREOPERATIVE DIAGNOSIS

Intussusception

#### DR. BURGIN'S DIAGNOSES

Acute upper respiratory infection  
Peptic ulcer of Meckel's diverticulum, possibly with perforation

#### ANATOMICAL DIAGNOSES

Primary intussusception of ileum  
Secondary intussusception of ileum into cecum

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. As is often the case, the written summary failed to give a clear impression of the clinical status of the patient. This was a desperately ill infant, and the surgeon, Dr. Robert R. Linton, who was called to see him in consultation immediately after entry noted with alarm the child's complete apathy to all modes of examination. He was evidently more impressed with the mass felt on rectal examination than was Dr. Burgin from merely reading the story, since he committed himself to a diagnosis of intussusception. The patient was prepared immediately for operation with intravenous fluid and a clvsi and taken to the operating room.

Exploration showed a double intussusception, evidently primary in the ileum, with secondary intussusception of this mass into the cecum. The secondary cecal intussusception proved readily reducible but the primary one in the ileum was not. The bowel wall showed considerable necrosis, and resection was necessary. The child failed to rally and quietly expired a few hours later. Postmortem examination contributed no further information.



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## WHAT SHALL I SUBSCRIBE?

SOME time between January 23 and February 7, every man and woman in Greater Boston will be solicited by a representative of the Community Fund Campaign—now an established enterprise in the life of our Metropolitan community. Every physician will have to make up his mind what he will pass on to the support of one hundred and fourteen agencies and federations, comprising more than one hundred and fifty hospitals, health centers and social-service organizations.

Those who have decided that they can and will give money frequently have much difficulty in arriving at a proper figure, and certainly no man can tell them individually what each should give. Thoughtful people, however, want to be intelligent givers and often welcome general information as

to some of their colleagues' standards, both as regards motives and amounts.

The charitable works of the profession as a whole and individually in any community are too well known to require comment here. Doctors by the very nature of their education and experience are socially minded. They contribute continuously of themselves. They—at least all but a few of them—believe, moreover, that they should not only give of their time and skill to the medical care of the people, but also contribute of their means to a comprehensive community program that ministers to all sorts of human needs. The great majority of physicians see the necessity of maintaining social and medical agencies as a *sine qua non* of preserving our present democratic system of life—the American system.

These men, desirous of taking their full share, are sometimes in doubt about the amount they should subscribe. To them should be said: "Determine first what can be easily afforded without sacrifice—then add an amount which entails *some* sacrifice."

A suggested basis of subscription issued by the Community Federation is a scale of giving that is graduated according to income, and from it one gathers that the standard for professional people varies from one per cent up to three per cent of yearly income. The statement, however, adds: "Giving must be adapted to individual circumstances. Some can afford to subscribe on a more liberal basis." If the doctors of Greater Boston can approach these figures, they will go well over the top of their quota, which is \$21,555, and thereby help to achieve a much needed oversubscription of the total goal of \$4,645,000.

The opportunity of making monthly or quarterly payments cannot be overemphasized. Thoughtlessly a doctor may give a solicitor a ten-dollar bill, hoping that by so doing he will rid himself of further obligation for the rest of the year. Could he be offended if he were asked to give the same amount every month or every three months during 1939?

In other words, each subscriber must answer for

himself these questions. What is my full share of support for this vast and inclusive community program? What should I give throughout the year for service that is continually rendered to the needy?

### A BASIS FOR FEE INSURANCE

THAT there is a general movement throughout the country to enable the consumers of medical service, particularly those in the low-income group, to pay their physicians' bills on an insurance basis cannot be denied. Furthermore, the scheme has been approved by organized medicine, with the proviso that all payments should be made in cash and that "agencies set up to provide such insurance should comply with state statutes and regulations to insure their soundness and financial responsibility and have the approval of the county and state medical societies under which they operate," and identical action was taken at the recent annual meeting of hospital administrators.

There remains the necessity for devising ways and means of providing reasonable forms of insurance. It is obvious that a plan which is acceptable in one state is not necessarily one best suited to another section of the country, for fee schedules and types of illness vary geographically. As a result, each state or subdivision thereof must determine the scheme best adapted to meet its particular needs.

The people of Massachusetts have had little, if any, experience with this type of insurance—with the exception of health insurance, as furnished by the old-line insurance companies. It seems reasonable to assume that an organization of the non-profit variety, under the supervision of physicians, public-health officials and hospital administrators, would be able to furnish adequate care at a lower figure than a commercial company with its overhead charges and its money-making responsibilities.

With this in mind the Associated Hospital Service Corporation is endeavoring to accumulate data in regard to professional fees that will serve to

provide a basis for the necessary charges in an insurance scheme to pay physicians' bills. A questionnaire in regard to their bills has been sent to twelve hundred physicians whose patients have had their hospital bills paid in full or in part by the Blue Cross. Already more than five hundred replies have been received. However, a much higher percentage must be obtained in order to provide figures that are representative, and all physicians who have received these questionnaires are earnestly requested to fill them out and forward them at the earliest possible moment.

### MASSACHUSETTS MEDICAL SOCIETY

A STATED meeting of the Council will be held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, February 1, at 10.30 a m.

#### Business

- 1 Call to order at 10.30 a m
- 2 Presentation of record of last meeting (Published in *New England Journal of Medicine*, 219 749-762, 1938)
- 3 Reports of Auditing Committee and Treasurer
- 4 Reports of standing committees
- 5 Reports of special committees
- 6 Appointment of delegates
  - a To the House of Delegates, American Medical Association, for two years from June 1, 1939
  - b To the annual meetings of the five New England state medical societies in 1939
  - c To the Annual Congress on Medical Education and Licensure, American Medical Association, at the Palmer House, Chicago, February 13 and 14, 1939
- 7 Incidental business

ALEXANDER S. BEGG, *Secretary*

Councilors are asked to sign one of the two attendance books before the meeting. The Cotting Luncheon will be served immediately after the meeting.

SECTION OF OBSTETRICS  
AND GYNECOLOGY

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## POSTPARTUM HEMORRHAGE

The case reports that have appeared in the *Journal* for the past two years have been collected from actual cases occurring in private and general hospital practice. As the different subjects were prepared it was very interesting to observe how easy it was to assemble cases on some subjects and how difficult on others. In fact, some presumably frequent conditions were relatively rare, and vice versa. For example, it was very hard to obtain reports of cases of placenta previa, but very simple to get them of cases of separated placenta. Hence, we believe that the hemorrhage in the majority of cases that bleed in the last few months of pregnancy is caused by some degree of separation of the placenta and that the occurrence of placenta previa of any sort is relatively uncommon. Placenta accreta has become an obstetrical entity solely because of expert pathological examination, it has only been in the last few years that the condition has been recognized, and cases of this sort have been difficult to accumulate. Their actual frequency can be determined only over a period of many years and is dependent on the establishment of adequate pathological departments in all our institutions in which obstetrics is practiced.

The next subject to be discussed is postpartum hemorrhage. We believe that there will be no great difficulty in obtaining cases of this sort. We shall confine the cases to those in which postpartum hemorrhage occurred at the time of labor or within the first few hours after delivery. Bleeding occurring later than this is classified as hemorrhage during the puerperium and will be taken up as a separate topic. The postpartum hemorrhage associated with ruptured uterus and placenta accreta has already been considered and will not be discussed further.

Atony of the uterus resulting in death is fortunately uncommon. Most cases of atonic uteri respond to some form of oxytocic stimulation. We have been brought up on the idea that overdistended uteri, such as those associated with hydramnios and twins, are prone to postpartum hemorrhage. We also connect postpartum hemorrhage with labors that are unduly long or unduly short. The cases that will appear sub-

sequently may or may not bear out these inherited inferences. Postpartum hemorrhage also follows lacerations of the cervix, perineum and vestibule. Bleeding from a laceration of the cervix is not nearly so common in this day of conservative operating as it was in the heyday of accouchement forcé. Postpartum hemorrhage is also associated with partially adherent and partially separated placentas. Illustrations of this sort we hope to find.

In practically all these cases of postpartum hemorrhage the question of transfusion arises. The necessity for obtaining a compatible donor, without too much delay, will be emphasized, and the aftercare of patients who have suffered acute loss of blood at the time of delivery will be considered.

## DEATHS

CAHILL—HARRY P. CAHILL, M.D., of 35 Crowninshield Road, Brookline, died January 15. He was in his fifty-sixth year.

Born in Worcester he attended the Worcester schools and Holy Cross College and received his degree from the Harvard Medical School in 1911. He interned at the Boston City Hospital where he eventually became chief of the Nose and Throat Service. When this country entered the War he was doing graduate research work in otology at the University of Basle in Switzerland as a Harvard Fellow. He returned here and entered the Medical Corps of the United States Army and, as a captain, served in France for ten months with the American Expeditionary Forces.

Dr. Cahill was professor of otology at the Tufts College Medical School, assistant professor of otology at the Harvard Medical School and, for many years, surgeon at the Massachusetts Eye and Ear Infirmary.

Among his affiliations were fellowships in the American Medical Association and the Massachusetts Medical Society, and memberships in the American Academy of Ophthalmology and Oto-Laryngology, the American Otological Society and the New England Otological and Laryngological Society. His widow, two sons and his mother survive him.

MARR—EDWARD L. MARR, M.D., of 17 West Wyoming Avenue, Melrose, died December 17, 1938. He was in his sixty-second year.

Born in West Southport, Maine, his family moved to Malden where he attended the local schools. In 1898 he enlisted for service in the Spanish War. He received his degree from Tufts College Medical School in 1910. Dr. Marr had practiced in Melrose for twenty-six years and was a school physician for fifteen years.

Among his affiliations were fellowships in the American Medical Association and the Massachusetts Medical Society. He was departmental surgeon for the Massachusetts department of the Spanish War Veterans.

His widow, a son, a daughter, a brother and a sister survive him.

PARKER—CHARLES C. PARKER, M.D., of 130 Gallivan Boulevard, Dorchester, died recently. He was in his forty-seventh year. Dr. Parker received his degree from Tufts College Medical School in 1918. He was a fellow of the American Medical Association and the Massachusetts Medical Society.

His widow, a daughter and two sons survive him.

**TALBOT**—**BERTELL L. TALBOT, M.D.**, of Milford, New Hampshire, died July 14, 1938. He was in his sixty-sixth year.

Dr Talbot received his degree from the Harvard Medical School in 1896 and was a member of the American Medical Association and the Massachusetts Medical Society.

His widow survives him.

**THOMPSON**—**JOHN S. THOMPSON, M.D.**, of Antigonish, Nova Scotia, died January 8. He was in his seventy-sixth year.

Born in Antigonish, he attended St. Francis Xavier College in that town and received his degree from Georgetown University School of Medicine in 1895. He served in the navy a short time before beginning medical practice in Cambridge in 1900. Dr Thompson retired from active practice about eight years ago.

He was a former member of the Massachusetts Medical Society.

A brother, a sister and a niece survive him.

## NEW HAMPSHIRE MEDICAL SOCIETY

### DEATH

**BLANCHARD**—**ROSCOE G. BLANCHARD, M.D.**, of Dover, New Hampshire, died on January 12, 1939, at the age of eighty six.

He was born in West Cumberland, Maine, in 1853, graduated from Bowdoin College in 1884 and had practiced in Dover since that time.

Dr Blanchard was a member of the local county and state medical societies and the American Medical Association. He was prominent in various Masonic bodies.

## VERMONT STATE MEDICAL SOCIETY

### VERMONT DEPARTMENT OF PUBLIC HEALTH

The following communicable diseases were reported to the office of the Department of Public Health during the month of October: chickenpox, 204, measles, 8, undulant fever, 2, scarlet fever, 19, typhoid fever, 4, whooping cough, 220, mumps, 42, lobar pneumonia, 3, German measles, 6, Vincent's infection, 6, tuberculosis, 9.

The Laboratory of Hygiene made 2551 examinations, the details of which are

Examinations for diphtheria bacilli	112
“ “ typhoid fever (Widal reaction)	50
“ “ undulant fever	117
“ “ gonococci in pus	121
“ “ tubercle bacilli	231
“ “ syphilis	1257
“ “ of water, bacteriological	227
“ “ water, chemical and bacteriological	156
“ “ milk, market	133
“ “ milk, submitted for microscopic only	2
“ “ foods	27
“ “ for courts, autopsies	3
“ “ courts, miscellaneous	34
Autopsies to complete death returns	3
Miscellaneous examinations	78

The director of the Division of Venereal Diseases reports 20 cases of gonorrhea and 59 cases of syphilis. Eleven speaking trips were made, chiefly to parent-teacher groups and to high schools.

The director of the Crippled Children's Division reports a total of 158 visits made by nurses and the social worker. At the beginning of the month, 6 patients were in hospitals, 9 were admitted and 12 discharged. Nine patients were in convalescent homes at the beginning of the month, and 1 patient was discharged from Warm Springs, Georgia. Fifty-six pieces of apparatus were fitted, 24 orthopedic corrections were made to shoes, and 2 pieces of apparatus were repaired. The occupational therapy director reports sales for the month of \$78.50.

The Public Health Nursing Division reports the opening of a new unit for Morristown and Stowe on October 15, with headquarters in Morrisville. Conferences and committee meetings took up the greater part of the month and the director spoke before ten of the county home demonstration finish up meetings.

The director of the Maternal and Child Health Division attended the meeting of the American Dental Association in St. Louis, also the meetings of the American Public Health Association and the American Pediatric Society. Six hundred and forty-seven baby booklets, 300 diphtheria consent cards and 451 notifications of birth registration were sent out during the month.

## MISCELLANY

### COMMUNITY FUND CAMPAIGN

During hard times—whether of “depression” or recession—and their years of aftermath there has been a greater call for free and partially free medical and hospital services.

Statistics are not dry when they reveal that in the past three years the number of patients given free or low price hospital and clinical care in those Metropolitan-district health services that receive aid from Greater Boston's Community Fund has almost doubled.

That the burden on the hospitals is excessive may be gleaned from the fact that last year member hospitals of the Greater Boston Community Federation used nearly \$100,000 from their endowment funds to meet current expenses of care for destitute and low income persons. The 114 agencies and federations participating in Greater Boston's 1939 Community Fund Campaign give not only hospital, dispensary and clinical services, but convalescent, maternity and home nursing care. There are social services for old and young, the deaf and the blind, services to give the underprivileged a fair chance in life, services designed to turn delinquency into constructive citizenship, services to train the handicapped to compete on an even basis with normal persons. Every phase of human well-being is within the Federation's scope, with much of it devoted to preventive medicine. Yet the health needs of the destitute and low income groups are not adequately met—a serious fact, not only for them but for the general health and economic strength of the whole community. In fact, if only to promote the general safety, wholesomeness and stability of community life, the valuable constructive work of all the agencies should be strengthened.

The three year-old Federation has been going steadily forward in its efforts to bring the agencies up to adequate support, after their years of reduced income due to depression. Because of this, and because more organizations are in the campaign this year, more givers and larger subscriptions are needed for Greater Boston's Community Fund Campaign, which, starting January 23, extends through February 7. Looking forward to a generous over subscription of the minimum goal of \$4,645,000, Stuart C. Rand, general chairman, and every member of his able

corps of assistants are asking all citizens to give till it feels good'

Each year the medical profession has been asked to pledge of its means, despite the fact that every day of the year the doctor gives freely of his services to many from whom he can never hope to obtain a cent. The doctors have responded, perhaps because they are so accustomed to answer the call of human need that the Community-Fund appeal finds their hands automatically reaching for a pen to sign a subscription

Few, if any, physicians feel that their free work entitles them to exemption from the Community Fund call, no more than it exempts thousands of other volunteers who give generously of their time and energy throughout the year to the work of social service agencies. Physicians and surgeons know, too, that hospitals, clinics and convalescent institutions give young members of the profession experience and training they could get nowhere else, and that they may bring their private patients to these institutions for the benefit of the judgment and skill of the older men who are the attending physicians and surgeons and for the use of the highly specialized and expensive equipment that would not otherwise be available were it not for the whole-hearted support of such institutions by the community

This year's group of one hundred and seven doctors lending their efforts to make the 1939 Community Fund Campaign a success is headed by Dr William B Breed. The ten subcommittees are as follows

Vice-chairman, Dr Herrman L. Blumgart. Committeemen Drs. Charles H Bradford, Newton C Browder, John G Downing, Henry E. Groden, Abraham Myerson, Max Rutvo, Virgil G Casten, Hugh C Donahue, Edward Harding, Francis Rouillard.

Vice-chairman, Dr Earle M. Chapman. Committeemen Drs. Hollis L. Albright, Frank E. Barton, G Marshall Crawford, Allen P Joslin, John V Leech, Alexander Marble, Thomas H. Peterson, Samuel N Vose, James K. Wardwell, Richard G Whiting

Vice-chairman, Dr R. Cannon Eley. Committeemen Drs. Geoffrey Edsall, Louis K. Diamond, William T Green, Randolph K. Byers, Henry E. Gallup, F William Marlow, Jr., Robert Sanderson.

Vice-chairman, Dr Marshall N Fulton. Committeemen Drs. James M Baty, Edward M. Cole, Lowrey F Davenport, Eugene C Eppinger, John P Hubbard, T Duckett Jones, Robert T Monroe, William T Salter, Reuben Z Schulz, Harry A. Warren

Vice-chairman, Dr Robert J Joplin. Committeemen Drs. Perry C Baird, Jr., Richard Chute, Walter E Garey, Jeremiah E. Greene, Sylvester B Kelley, G Douglas Krumbhaar, Lendon Snedeker, J Sydney Sullman, Thomas V Urmy, Charles B Kimmel

Vice-chairman, Dr Alfred O Ludwig. Committeemen Drs. Donald V Baker, John W Cass, Jr., Howard C Coggeshall, John R. Frazoo, Ward I Gregg, Alfred Kranes, James H Means, Michael E. Murray, Paul Norton, John W Zeller

Vice-chairman, Dr William B Stevens. Committeemen Drs. John A Abbot, Louis Arkin, William Dameshek, Julian C Gant, Joseph Lentine, Jacob Lorman, Walter S Levenson, Jacob H Swartz, George S Speare, Abraham Rudy

Vice-chairman, Dr Charles L. Swan, Jr. Committeemen Drs. Arthur Berk, Benedict F Boland, James E Fish, Ashton Graybiel, Reed Harwood, Eugene E. O'Neil, Clifford C Franseen, Weston T Buddington.

Vice-chairman, Dr Soma Weiss. Committeemen Drs. Leo Alexander, Seth F Arnold, Austin M Brues,

John T Edsall, Maxwell Finland, George E Heels, Franc D Ingraham, Paul Kunkel, G Kenneth Mallory, Merrill C Sosman

Vice-chairman, Dr Greene Fitzhugh. Committeemen Drs. Henry Clifford, Benjamin Cornwall, Moses Lurie, Bretney Miller, John P Monks, John L. Newell, Langdon Parsons, Somers Sturgis, Milton Thompson, Claude E. Welch

## TRICHLORETHYLENE DEGREASERS

A common method of cleaning metal objects coated with oil, grease or similar substances is by means of an organic solvent applied in a degreaser. The usual degreaser is a tank suitable in size to the work, in which the solvent is heated to boiling at the bottom and the vapor subsequently condensed by water cooling at a higher level. Trichlorethylene is the solvent almost universally used. Questions as to the effect of such a machine on the health of workers employed in its vicinity are frequently raised

When idle, even though the tank be open, the escape of vapor from a properly adjusted degreaser is not great unless there is a strong current of air over the top of the tank. The introduction and removal of objects into and from the machine greatly increase the escape of solvent vapor. It has been found, however, that small and medium-sized degreasers, properly operated and not overloaded, do not constitute an important health hazard, even when used continually, provided that they are placed in a reasonably well ventilated room. Larger machines—those of over 12 square feet cross-sectional area—may on the other hand subject the operator to high concentrations of solvent vapor, especially if used continually. The cleaning out of degreasers, particularly those in which the worker must enter the tank in the process, may involve exposures to very high concentrations of trichlorethylene vapor for limited periods of time.

Trichlorethylene vapor in high concentrations will cause unconsciousness and even death, but the ill effects of repeated exposure to small concentrations are apparently less severe than those of most other chlorinated hydrocarbons. Much of the trouble caused by trichlorethylene in the past has been attributed to impurities not present in the product now commercially available. Continuous exposure to concentrations too low to cause immediate effects, such as headaches and dizziness, may nonetheless eventually injure the worker. Addiction to trichlorethylene not infrequently follows continued exposure to high concentrations of vapor.

The following rules for the safe operation of degreasers are advised

- 1 Place the degreaser in a high posted, good-sized room, if possible. If only a small room is available, install one or more window fans to improve the general ventilation
- 2 Be sure that there is an adequate supply of cooling water for the condenser of the degreaser
- 3 Never allow the machine to be so overloaded that the vapor line rises above the condenser tubes
- 4 Make sure that the process of cleaning out the tank does not involve an excessive exposure to solvent vapor. This can usually be accomplished by airing out the machine after withdrawal of the liquid, but additional precautions may sometimes be necessary. Cartridge respirators do not give adequate protection if the exposure is heavy. Hose masks or air line respirators may be used if they do not impede the worker too greatly

- 5 Local exhaust ventilation, through slots along the edges of the tank, should be necessary only in extreme cases. Such ventilation will reduce the concentration of solvent vapor in the air but is likely to increase the loss of solvent.
- 6 If the odor of the solvent persists in the vicinity of the machine, or if workers complain of ill effects, notify this office and ask for an air analysis. The atmospheric concentration of trichlorethylene vapor should not exceed 200 parts per million parts of air.

*Division of Occupational Hygiene,  
Massachusetts Department of Labor and Industries*

## NOTES

Dr. Riley H. Guthrie, chief executive officer of the Boston Psychopathic Hospital, has been appointed first assistant physician at Saint Elizabeths Hospital, Washington, District of Columbia; it has been announced by Dr. Winfred Overholser, superintendent of the hospital. Dr. Guthrie received the degree of Doctor of Medicine from the University of Tennessee School of Medicine in June, 1921. He served on the staff of the State Hospital at Little Rock, Arkansas, for three years, spent two years in private practice, and then resumed institutional work as assistant physician at the State Hospital at Massillon, Ohio. Following this he was appointed medical officer at the Boston Psychopathic Hospital, serving for one year, and for six years thereafter was assistant superintendent of the Monson State Hospital at Palmer, Massachusetts. In June, 1935, he was appointed assistant to the Commissioner of Mental Diseases of Massachusetts, and in November of the same year chief executive officer of the Boston Psychopathic Hospital. He is a diplomate of the American Board of Psychiatry and Neurology, and has contributed extensively to the literature of psychiatry. In a recent countrywide competitive examination held by the United States Civil Service Commission he received the highest rating given.

Middlesex University announces the appointment of Dr. Louis Bergmann, of Vienna, to a full time teaching position in the School of Medicine, as associate professor of anatomy. Dr. Bergmann received his M.D. degree from the University of Vienna, where he served as assistant to Prof. Julius Tandler in the anatomical department. He accompanied Prof. Tandler in 1934 to China, where he was associated with the National Medical College of Shanghai and taught anatomy at the Hunan Yale Medical College in Changsha and at the Army Medical College in Nanking.

## CORRESPONDENCE

### TRANSFUSION OF INCOMPATIBLE BLOOD

*To the Editor:* Your editorial and the letter from Dr. Dameshek, printed in a recent issue of the *Journal* calling attention to the dangers of incorrect blood grouping, surely come at an opportune time. I should like to express my agreement with your opinions, and also call attention to other dangers of a slightly different sort which may result from incompetent blood group determinations.

It seems to me that part of the trouble is traceable to the lack of properly qualified experts in this field. This in turn is perhaps due to the fact that blood grouping,

though recognized as important, is scientifically treated as a sort of stepchild, often being taught as a part of some subject not closely related. There are no chairs of blood grouping in our schools, and it is difficult for a person whose research has been chiefly concerned with blood grouping to get an academic position, unless he has a second string to his bow. Consequently there is little financial stimulus for promising young men to devote themselves to the study of this important, and fascinating, subject. This is in unfortunate contrast to the situation which prevails in some foreign countries, for example, the U. S. S. R., where the chief cities have institutes specifically devoted to the study of blood groups and blood transfusion.

It is perhaps not necessary that all routine blood group determinations be carried out by experts who have spent years in a study of the subject, though it would certainly be desirable that the work be done by persons with better training than that now routinely available. But it would seem highly important that such experts be available, at least one in every city, so that their advice could be sought, as in the preparation of serum and in the not too infrequent cases of peculiar reactions encountered in blood grouping.

In one such case, a young man who claimed that his blood group had changed from Group O to Group A was retested in my laboratory, with the result that he was found to belong to the weakly reacting type of Group A, designated A<sub>2</sub>. It is well known that some Group B serums may lack (or lose after brief storage) the agglutinin for this type of blood, so it is likely that the technician in the first hospital (one of the large hospitals in this city) used such a serum and wrongly classified the young man as belonging to Group O. The startling thing about this story is that, according to his own account, the young man had been used twice as a donor, under the impression he belonged to Group O!

It is probably no exaggeration to say that not one in fifty of those who routinely attempt to determine blood groups could give an intelligible account of the sub-groups A<sub>1</sub> and A<sub>2</sub>, of the independent blood types M, MN and N, or of the possible kinds of irregular reactions. In 99 cases out of 100, this knowledge is not needed, but in the hundredth case it may mean the difference between life and death for the patient.

A further danger to the public lies in the fact that many grossly unqualified persons are willing to constitute themselves experts in this important field, when as a matter of fact they are almost entirely without training in it. It should be emphasized that the possession of a medical or Ph.D. degree, or even a lifetime of experience in some other branch of medical science, does not constitute a person an expert in blood grouping, which is itself a special and intricate subject, with its own discipline and large body of literature.

It is to be hoped that something can be done to remedy this situation, perhaps departments or even whole institutions devoted to the study of this important subject will ultimately be established. In the meantime it would seem that the least that can be done is to come to some sort of agreement as to the qualifications which a person must possess before being permitted to carry out clinical blood group determinations and what qualifications constitute an expert in the subject.

WILLIAM C. BOYD, Ph.D.  
Boston University School of Medicine,  
Boston

NOTICES

ANNOUNCEMENT

EDWARD S STONE, M.D., announces the opening of an office at 416 Marlborough Street, Boston

MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, January 26, in the amphitheater of the Peter Bent Brigham Hospital, Dr Samuel A Levine, assistant professor of medicine, Harvard Medical School and senior associate in medicine, Peter Bent Brigham Hospital, will give a medical clinic Practitioners and medical students are cordially invited to attend

WINTHROP COMMUNITY HOSPITAL

The next meeting of the staff of the Winthrop Community Hospital will be held at the hospital on Thursday evening, January 26, at 8 30

Dr Joseph H. Burnett will speak on "Fractures and Sprains of the Ankle Joint Their diagnosis and treatment." The talk will be illustrated by practical demonstrations

Nurses and medical students are cordially invited to attend.

J J ABRAMS M.D., Secretary

SYMPOSIUM ON THE PUBLIC-HEALTH SIGNIFICANCE OF THE VIRUS AND RICKETTSIAL DISEASES

The faculty of the Harvard School of Public Health is offering a short course of lectures, clinics and demonstrations on the virus and rickettsial diseases, with special emphasis on their public-health significance, to be held at the school during the week of June 12 17, 1939 Lectures on the etiology, epidemiology and methods of control of these diseases, given by members of the faculties and by former students of the Harvard School of Public Health and of the Harvard Medical School, will occupy five mornings. Special clinics and demonstrations will be given each afternoon In some instances these demonstrations will be continued through the week, so that all the members of the symposium can attend. On the last morning, a panel discussion will be held on the three main topics presented in the symposium.

The fee for the course will be \$25 00, payable at any time up to June 12. Enrollment, however, should be arranged before June 1, as facilities for many of the clinics and demonstrations are limited. The lectures will be published later in a single volume, which will be sent to each person who has registered for the course.

Further information may be had by writing to the Secretary of the School of Public Health, 55 Shattuck Street, Boston

ROBERT B BRIGHAM HOSPITAL

There will be an open meeting at the Robert B Brigham Hospital, 125 Parker Hill Avenue, Roxbury, Tuesday evening, February 7, at 8 00

Dr Loring T Swann will give an illustrated talk on "Prevention and Correction of Deformities in Chronic Arthritis"

All doctors and medical students are cordially invited to attend.

EDITH I COV, Superintendent

SUFFOLK DISTRICT MEDICAL SOCIETY

There will be a meeting of the Suffolk District Medical Society at the Boston Medical Library, 8 Fenway, on Wednesday evening, January 25, at 8 15

PROGRAM

A DISCUSSION OF RECENT PROGRESS IN DIABETES  
(arranged by Dr E. P Joslin)

Resume of the Diabetic Situation Here and Elsewhere. Dr E. P Joslin.

Treatment with Diet and Protamine Zinc Insulin in Hospital and Home. Dr A. P Joslin.

Crystalline Insulin. Dr Alexander Marble.

Diabetic Coma. Dr Howard F Root.

Peculiarities in Therapy of Diabetic Children on Two Continents. Dr Richard Wagner

Hypoglycemia. Dr Henry Baker and Dr Alexander Marble.

A Resume of Dr Harvey Cushing's Patients with Acromegaly and Young's Experimental Pituitary Diabetes. Dr Howard F Root.

Thirty Nine Pregnancies in Diabetics in 1938 and Studies Thereon. Dr Priscilla White.

The Emphasis Shifts from Treatment to Prevention and Early Detection of Diabetes. Dr E. P Joslin

The Future. Dr E. P Joslin.

JOHN P MONKS, M.D., Secretary

BOSTON GASTROENTEROLOGICAL SOCIETY

The next meeting of the Boston Gastroenterological Society will be held in the auditorium of the Joseph H. Pratt Diagnostic Hospital, Bennet Street, at 12 o'clock noon, Wednesday, January 25, Dr Hilbert F Day will preside. Dr Samuel Proger will direct inspection of the new hospital either before or after the program. Miss Frances Stern will present a dietetic exhibition

PROGRAM

Pancreatic Enzymes. Dr Joseph H. Pratt.

Lesions About the Pylorus. Dr Jacob J Schloss

Hemorrhage Due to Peptic Ulcer. Dr Henry H. Lerner

Chronic Duodenal Ileus. Dr Katherine S Andrews

C W McCLURE, M.D., Secretary

MASSACHUSETTS PSYCHIATRIC SOCIETY

There will be a meeting of the Massachusetts Psychiatric Society at the Boston Psychopathic Hospital, Friday evening, January 27, at 8 00

Judge John F Perkins of the Boston Juvenile Court will speak, and Drs Abraham Myerson and Kenneth J Tillotson will present a paper "Theory and Practice of the Total-Push Method in Schizophrenia."

W FRANKLIN WOOD, M.D., Secretary

BOSTON MEDICAL LIBRARY

The annual meeting of the Boston Medical Library will be held in Sprague Hall at 8 Fenway, Tuesday afternoon, January 24, at 4 30 o'clock. Reports will be received from the Board of Trustees, the Treasurer, the Librarian and from the various committees. Two vacancies on the Board of Trustees are to be filled

All fellows of the Library are urged to attend

JAMES M FAULKNER, M.D., Secretary

## NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Norfolk District Medical Society will be held in the Evans Auditorium of the Massachusetts Memorial Hospitals, 78 East Concord Street, Boston, on Tuesday evening, January 31, at 8 30

## PROGRAM

Erythroblastosis Foetalis Dr H. C. Petterson  
Presentation of a Case of Osteomyelitis of the Frontal Bone. Dr L. F. Johnson.  
Demonstration of Technic Employed in the Placental Block Bank. Dr F. E. Barton  
Cardio-omentopexy for Revascularization of the Ischemic Heart. Medical—Dr Ashton Graybiel  
Surgical—Dr J. W. Strieder  
Hyperthyroidism and Heart Disease Dr H. M. Clute  
FRANK S. CRUICKSHANK, M.D., Secretary

## ARLINGTON AND BELMONT MEDICAL CLUBS

A combined meeting of the Arlington and Belmont medical clubs will be held at Hambury Hall, Ring Sanatorium and Hospital, on Tuesday evening, January 24, at 8 00

The report of a study on "The Use of Insulin in Toxic Hallucinosi" will be presented by Drs. Hosea W. McAdoo and Curtus T. Prout of the Ring Sanatorium staff

Following the program a buffet supper will be served.

MICHAEL F. NIGRO, M.D., Secretary  
Arlington Doctors Club  
LEO A. BLACKLOW, M.D., Secretary  
Belmont Medical Club

## SALEM HOSPITAL PUBLIC-HEALTH LECTURES

The Salem Hospital will conduct a series of Sunday afternoon lectures this winter on medical subjects of general public interest. The purpose of these lectures is to afford the layman an opportunity to gain an accurate knowledge of methods for the protection of his health and the prevention of illness.

The lectures will be free to the public and will be held in the auditorium of the Nurses Home during January, February and March, at 4 00 p. m. The first lecture was given January 15 by Dr. Walter G. Phippen, who spoke on 'Liver Complaint and Gall Bladder Disease.'

The remainder of the program is as follows:

January 22 Skin Evidence of General Ill Health. Dr E. Lawrence Oliver  
January 29 How Are Your Kidneys? Dr Henry D. Stebbins  
February 5 Your Teeth. Dr Edgar A. Wright.  
February 12 The Position of X Ray in Present Day Medicine. Dr Stanley A. Wilson.  
February 19 Watch Your Diet. Miss Edith L. Hoadley.  
February 26 The Health of the Preschool Child. Dr Robert T. Moulton.  
March 5 Why Nerves? Dr William V. McDermott.

## AMERICAN BOARD OF OPHTHALMOLOGY

The American Board of Ophthalmology announces an important change in its methods of examination of candidates for the board's certificate.

Examinations will be divided into two parts. Candidates whose applications are accepted will be required to pass a *written* examination which will be held simultaneously in various cities throughout the country approximately sixty days prior to the date of the *oral* examination.

The *written* examination will include all the subjects previously covered by the practical and oral examinations.

*Oral* examinations will be held at the time and place of the meeting of the American Medical Association and of the American Academy of Ophthalmology and Otolaryngology, and occasionally in connection with other important medical meetings. The *oral* examination will be on the following subjects: external diseases, ophthalmoscopy, pathology, refraction, ocular motility, and practical surgery.

Only those candidates who pass the *written* examination and who have presented satisfactory case reports will be permitted to appear for the *oral* examination.

Examinations scheduled for 1939: *written* March 15 and August 5, *oral*, St. Louis, May 15, and Chicago, October 6.

Applications for permission to take the *written* examination March 15 must be filed with the secretary not later than February 15.

Application forms and detailed information should be secured at once from Dr. John Green, secretary, 6330 Waterman Avenue, St. Louis, Missouri.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, January 24, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance), at 8 15 p. m.

## PROGRAM

Presentation of cases

Some Clinico-roentgenological Correlations. Dr. Merrill C. Sosman and Dr. Samuel A. Levine.

Medical students and physicians are cordially invited to attend.

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JANUARY 23

## MONDAY, JANUARY 23

8 15 p. m. New England Heart Association. Boston City Hospital Mallory amphitheater.

## TUESDAY, JANUARY 24

9 10 a. m. Joseph H. Pratt Diagnostic Hospital. X-ray demonstration. Dr. Alice Ettlinger.

\* 10 a. m. 12 30 p. m. Tumor clinic. Boston Dispensary.

4 30 p. m. Boston Medical Library annual meeting. Sprague Hall.

8 15 p. m. Harvard Medical Society. Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance).

## WEDNESDAY, JANUARY 25

9 10 a. m. Joseph H. Pratt Diagnostic Hospital. Hospital case presentation. Dr. S. J. Thannhauser.

12 m. Clinicopathological conference. Children's Hospital amphitheater.

12 m. Boston Gastroenterological Society. Auditorium of the Joseph H. Pratt Diagnostic Hospital. Bennet Street, Boston.

8 15 p. m. Suffolk District Medical Society. Boston Medical Library.

## THURSDAY, JANUARY 26

8 30-9 30 a. m. Exchange visit. Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Orthopedic.

9 10 a. m. Joseph H. Pratt Diagnostic Hospital. Medical social service case presentation. District Service and Social Service Staff.

3 30 p. m. Medical clinic at the Peter Bent Brigham Hospital.



## FRIDAY JANUARY 27

9 10 a m. Joseph H Pratt Diagnostic Hospital Examination of Coronary Circulation by the Injection of a Radio-Opaque Substance. Dr F T Fulton.

\*10 a m. 12 30 p m. Tumor clinic. Boston Dispensary

8 p m Massachusetts Psychiatric Society Boston Psychopathic Hospital.

## SATURDAY JANUARY 28

\*9 10 a m. Joseph H Pratt Diagnostic Hospital Hospital case presentation. Dr S J Thannhauser

\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian.

## SUNDAY JANUARY 29

4 p m. Illustrated public, health lecture, Faulkner Hospital auditorium Recent Advances in the Treatment of Bone Injuries Dr Gordon M Morrison.

4 p m. Free public lecture, Harvard Medical School amphitheater of Building D Food and Drugs. Safe and unsafe. Dr J J Durrett. U S Food and Drug Administration

\*Open to the medical profession

JANUARY 20—Massachusetts Italian Medical Society Page 84 issue of January 12

JANUARY 22—Lecture at the Faulkner Hospital Page 971 issue of December 15

JANUARY 22—Free Public Lecture, Harvard Medical School Page 1056 issue of December 29

JANUARY 22—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29

JANUARY 22 MARCH 5—Salem Hospital Public Health Lectures Page 126

JANUARY 23—New England Heart Association Page 83 issue of January 12.

JANUARY 24—Harvard Medical Society Page 126

JANUARY 24—Boston Medical Library Annual meeting Page 125

JANUARY 24—Arlington and Belmont medical clubs Page 126

JANUARY 25—Boston Gastroenterological Society Page 125

JANUARY 26—Medical clinic at the Peter Bent Brigham Hospital Page 125

JANUARY 26—Winthrop Community Hospital Page 125

JANUARY 27—Massachusetts Psychiatric Society Page 125

FEBRUARY 4 MAY 15 and 16—American Board of Obstetrics and Gynecology Page 451 issue of September 22 (Application for admission to Group A examinations must be on file in the Secretary's office by March 15 instead of April 1 as previously stated)

FEBRUARY 7—Robert B Brigham Hospital Page 125

FEBRUARY 9—Pentucket Association of Physicians 8.30 p m Hotel Bartlett, 95 Main Street, Haverhill

MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126.

MARCH 27 31—American College of Physicians Page 36 issue of July 7

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 15-16—American Board of Obstetrics and Gynecology Inc. Page 937 issue of December 8

MAY 15-19—American Medical Association St Louis Missouri

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125

JUNE 26-29—National Tuberculosis Association. Page 936 issue of December 8.

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22.

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 935 issue of December 8

SEPTEMBER 15 28—Pan Pacific Surgical Association Page 863 issue of November 24

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

FEBRUARY 8—Essex Sanatorium Middleton Clinic at 5 p m. Dinner at 7 p m. Speaker: Dr Edward Churchill Subject: Surgical Treatment of Pulmonary Suppuration

MARCH 1—Lynn Hospital. Clinic at 5 p m. Dinner at 7 p m. Speaker: Dr John Rock. Subject: Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m. Dinner at 7 p m. Speaker: Dr Ethan Allan Brown Subject: Allergy

MAY 10—Annual meeting. Salem Country Club Peabody

## NORFOLK

JANUARY 31—Page 126

## SUFFOLK

JANUARY 25—Symposium on Diabetes. Page 125

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m. Program and speakers to be announced.

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

## WORCESTER

FEBRUARY 8—Worcester State Hospital.

MARCH 8—Worcester Memorial Hospital

APRIL 12—Worcester Hahnemann Hospital

MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6:30 p m which is followed at 7 30 p m by the business and scientific sessions

## BOOKS RECEIVED FOR REVIEW

*Scarlet Fever* George F Dick and Gladys H. Dick. 149 pp Chicago The Year Book Publishers, Inc., 1938 \$2 00

*The Journals of Bronson Alcott* Selected and edited by Odell Shepard. 558 pp Boston Little, Brown & Co, 1938 \$5 00

*The Abnormal in Obstetrics* Comyns Berkeley, Victor Bonney and Douglas MacLeod 525 pp Baltimore William Wood & Co, 1938 \$6 00

*The New International Clinics Original contributions clinics and evaluated reviews of current advances in the medical arts* Edited by George M. Piersol. Vol. 4, N S 1 349 pp Philadelphia, Montreal, New York J B Lippincott Co, 1938 \$3 00

*The Treatment of Fractures* Charles L. Scudder Eleventh edition 1208 pp Philadelphia and London W B Saunders Co, 1938 \$12 00

*The Extra Pharmacopoeia* Martindale. Twenty First edition. Vol 2. 1148 pp London The Pharmaceutical Press, 1938 22s 6d

*Hygiene Manual of public health* J R. Currie. 324 pp Baltimore William Wood & Co, 1938 \$5 00

*Biology for Pharmaceutical Students and Others* S Mangham and A. R. Hockley 613 pp Baltimore William Wood & Co, 1938 \$6 50

*Trauma and Internal Disease A basis for medical and legal evaluation of the etiology—pathology—clinical processes—following injury* Frank W Spicer 593 pp Philadelphia, London and Montreal J B Lippincott Co, 1939 \$7 00

*Biographies of Child Development The mental growth careers of eighty four infants and children* Part 1 by Arnold Gesell. Part 2 by Catherine S Amatrudda, Burton M. Castner and Helen Thompson 328 pp New York and London Paul B Hoeber, Inc., 1939 \$3 75

## BOOK REVIEWS

*Interns Handbook A guide especially in emergencies for the intern and the physician in general practice* M. S Dooley Second edition, revised and reset. 523 pp Philadelphia, London, Montreal J B Lippincott Co, 1938 \$3 00

The first edition of this handbook was published in 1929 The *Journal* (202-97, 1930) reviewed it favorably, saying that the book contained a great deal of valuable information presented clearly in concentrated form.

The first part included a physician's drug list and an outline of the emergency treatment of drug poisoning The second part outlined standard clinical procedures for

history taking, dietary, routine laboratory tests and techniques for safeguarding laboratory specimens. The *Journal of the American Medical Association* (93 1173, 1929) termed it a guidebook which would enable interns and clinical clerks to adapt themselves easily to hospital routine and to acquire ability to render effective service. This seemed a fair characterization.

The second edition is a new model. It is larger than the first—523 pages against 235, its contents have been rearranged. Now it begins with a description of the intern's relation to the hospital, tells him how to become housebroken, how to procure necropsies, what to read. The second part deals with the laboratory and is a handy compendium of clinical pathology. The third section concerns medicine, the fourth, surgery, and the fifth, therapy, where once more the emergency treatment of drug poisoning is included. The sixth section deals with nursing, wherein are described simple methods for improvising backrests or cradles, for turning a helpless patient and for bedmaking, all taken as a matter of course in hospital life but which are not so simple when young Lydgate goes alone to his first sick patient's home with no equipment but his own common sense and the recollection of how things were done when he was an intern.

All this information once again is well printed in legible type, is presented in clear, concentrated form, so arranged that quick reference is possible, and is compressed into a small-sized volume which easily fits into one's bag or pocket. The *Journal* is glad to repeat the book is one of the best of its kind and should be useful to practitioners as well as to interns.

*Meningiomas Their classification, regional behaviour life history and surgical end results* Harvey Cushing  
785 pp. Springfield, Illinois Charles C Thomas,  
1938 \$15.00

It has long been hoped that Dr. Cushing would, now that he has retired from the active practice of surgery, review his experiences with various types of brain tumors and record not only the results but his methods of handling these dangerous and destructive lesions. Away from the two hospitals where his work was done and giving much of his time to literary work and the cataloguing of his large library of historical works, many must have thought that no effort on his part would result in a book such as he has produced on meningiomas. He not only brought to his desk in New Haven the records by photostat of all his patients, but he also followed them as carefully as if each were still calling at his office. A total of 313 cases, each followed to death or, if living, to the present time, with accurate notes of the conditions at postmortem or reports on the clinical conditions of all living patients, is presented in this monograph. At once it may be said that no surgeon has ever had such a complete series of case histories to deal with, for no surgeon up to Dr. Cushing's time ever followed all his cases so persistently. Great credit for this should go also to the junior author, Dr. Eisenhardt, who has shown as much zeal in following patients as in working out the details of the pathology of meningiomas.

The series of cases, operated on from October, 1903, to October, 1932, constitutes the bulk of the volume. Each case history is given in detail with a wealth of illustrations—roentgenograms, operative sketches, photographs of tumors, photographs of patients and pictures showing the microscopic appearance of the lesions. In addition, there are chapters on pathology, tumor incidence, the types of tumors according to their location, diagnosis and operative technic and a complete bibliography and index.

The introductions to many chapters contain historical material, often illustrated. An unusual feature is the recording of the actual name of each patient and the giving over of separate chapters to the Case of Timothy Donovan and the Case of Dorothy Russell, two brave patients, each with recurrent meningiomas requiring repeated operations. With humanity seldom found in text books and with true literary skill, Dr. Cushing has depicted the medical lives of two heroes, both sure to have a permanent place in the annals of medical history.

In regard to meningiomas in general the following points are brought out: solitary tumors have favorite loci of origin, tumors of each locus behave in much the same way, certain meningiomas tend to recur, 172 of the 313 patients were alive in 1937—132 with a period of five years or more after operation, the survival period may be twenty or more years, case mortality was greatly reduced as the result of electrosurgical methods introduced in 1927, meningiomas may be classified according to nine pathological types, with variants, the types often described as epitheliomatous or sarcomatous have a favorable prognosis as the 'dural endotheliomas' or the fibroblastic tumors. These and many other points are clearly brought out.

A word should be said in regard to the publisher and printer. The illustrations, skillfully placed on each page, are remarkably clear, the tables finely arranged and the spacing about the figures carefully placed. Each page has a pleasing appearance as well as boldly bringing out the illustrative points by both pictures and variations in type. In a 785 page book with 685 illustrations and numerous charts, only one unimportant error was found in a fairly complete reading of the text.

The reviewer is left with the impression that a book of more than ordinary value has come to his hand. Every page shows the master surgeon and the literary ability of the author. To be sure, no one else had so much knowledge of this type of tumor as did the author, but, on the other hand, who but Dr. Cushing could write so clearly so frankly of his mistakes and so charmingly about his patients? Surgically, this is a book of the first importance, historically, it is a classic.

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The purpose of the author of this book is to have it included in the family library for the instruction of those who may be responsible for the health of the household.

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The chapters next in order are devoted to nursing and the care of convalescent patients and to a consideration of chronic diseases. The remaining pages—over half the book—deal with the symptomatology, diagnosis and treatment of diseases, accidents and other emergencies, approved diet lists and co-ordinate subjects.

The book is well written and in a concise fashion covers most of the common phases of illness, but the question as to the wisdom of trying to teach non-medical persons so much of medicine seems pertinent because some people may be led to feel that the employment of a doctor in a given case is not required, with disastrous results.

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## TREATMENT OF CHRONIC ALCOHOLISM WITH AMPHETAMINE (BENZEDRINE) SULFATE\*

WILFRED BLOOMBERG, M.D.†

BOSTON

AMPHETAMINE (Benzedrine) sulfate was introduced into therapeutics in 1935 by Prinzmetal and the author<sup>1</sup> as an effective agent in the prevention of symptoms in narcolepsy. Since that time it has been used for a great variety of conditions, and has been found to be of value in relaxation of the gastrointestinal tract<sup>2</sup> and in the treatment of postencephalitic Parkinsonism<sup>3</sup> and obesity of neurotic origin.<sup>4</sup> Its efficacy in narcolepsy has been confirmed.<sup>5</sup> In addition, numerous reports have established the fact that amphetamine sulfate has a striking effect on the mood in psychotic and psychoneurotic patients and in normal individuals,<sup>6</sup> and on the intelligence, or rather perhaps on mental alertness, as demonstrated by its influence on psychometric scores.<sup>7</sup>

Because of the "lift" given by amphetamine sulfate, because it was found to be extremely effective in relieving "hangover" on the morning following excessive indulgence in alcohol, and because taken beforehand the drug appeared to increase the ability to consume alcohol without intoxication, it seemed reasonable to try its effect as a replacement for alcohol in the chronic alcoholic. It seems probable that at least some alcoholics drink in order to make themselves feel more adequate to their situations. A mild alcoholic "glow" overcomes their feelings of inferiority, it loosens their tongues and their wit, and permits them to vanquish shyness and embarrassment. The fact that this is only a transient state in the excessive consumption of alcohol and is followed by an exaggeration of all the unpleasant feelings, plus indeed depression and certain physical symptoms, such as headache, nausea, dizziness and gastrointestinal disturbance, has notoriously never been a sufficient reason to hinder the chronic alcoholic from

overindulgence. Nor does the fact that the secondary depression is severe prevent him from attempting to drown his primary depression in liquor. Because amphetamine sulfate modified the mood it was hoped that it would affect the situation of the chronic alcoholic.

In addition to these general considerations, there is the fact that the central stimulating effect of amphetamine sulfate was first noted by Alles and Prinzmetal<sup>8</sup> when it awakened barbitalized dogs. In patients suffering from drug comas due to the barbiturates, the opiates or even paraldehyde, amphetamine sulfate has proved useful. Since the action of alcohol is at least akin to that of these sedative and narcotic drugs, such facts gave additional basis for an attempt to elicit an antagonism between alcohol and amphetamine.<sup>9</sup>

### METHOD

Patients were seen partly in office practice, referred by other physicians or by other patients, and partly at a clinic at the Boston City Hospital, referred by other outpatient and house services. All chronic alcoholics who could be persuaded to try the treatment received it. Only 1 refused treatment, and his case is not included in the following reports. The only selection practiced was refusal to treat 2 patients, 1 a private and 1 a clinic case, both of whom had already stopped drinking. They had done this so long before we saw them that any results obtained would have no significant value in this experiment, since it would be impossible to attribute the cessation of drinking to treatment. Other than these 2, the cases were entirely unselected, except in so far as selection took place when patients were referred, because other methods had so far failed.

An attempt was made to avoid all formal psy-

From the Neurological Unit, Boston City Hospital, and the Department of Neurology, Harvard Medical School.

This study was aided by a grant from the Smith Kline and French Laboratories, Philadelphia.

†Instructor in neurology, Harvard Medical School; junior visiting neurologist, Boston City Hospital.

\*After this study was begun, reports by Reifstein and Davidson<sup>10</sup> and by Wilbur, MacLean and Allen<sup>11</sup> on the use of amphetamine sulfate in acute alcoholism have given further confirmation to the above theoretical considerations.

history taking, dietary, routine laboratory tests and techniques for safeguarding laboratory specimens. The *Journal of the American Medical Association* (93 1173, 1929) termed it a guidebook which would enable interns and clinical clerks to adapt themselves easily to hospital routine and to acquire ability to render effective service. This seemed a fair characterization.

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drink—had been 6 days. In the previous 2 or 3 years he had averaged sixteen drinks of gin daily. He was obviously under the influence of alcohol at the time of the first interview.

He was started on amphetamine sulfate, 10 mg twice daily. On the day after his first visit he stopped drinking. During the next few months he was seen often, and constantly reiterated that he had no desire for alcohol, felt well and had no untoward symptoms. In November, 1937, he went on a 3-month cruise to the tropics as a passenger on a freighter. On his return in March, 1938, he reported that he was still under no temptation to drink. He had had an occasional glass or two of beer and one or two highballs during the voyage, but always in company and because the water was thought to be bad, he had not been drunk nor had any craving for alcohol, his small amount of drinking he characterized as 'social drinking'. He had continued to take amphetamine sulfate daily throughout the trip.

On March 31 he again reported that he was not drinking and declared that the present treatment was the most effective he had ever had. However, on April 6 the patient reported that he had been drinking fairly heavily for 3 or 4 days. At the beginning of this period the culminations of a financial tangle and a difficult domestic situation had occurred coincidentally. He had stopped taking amphetamine sulfate and started drinking—he could not say exactly why. He insisted that his daily consumption during this period was far less than his average before treatment. He thought that the episode was over. He was started again on amphetamine sulfate, 40 mg daily, and the drinking stopped. He was seen again on September 29 when he said he had not been drinking since the last visit, except for a few glasses of beer during July, which he considered as 'social drinking'.

On October 26 the patient's wife reported that he had been drinking heavily for several days. On November 3 he himself came in and stated that he had drunk nothing for about 7 months, except for the few glasses of beer in July, until about 10 days previous to this visit, when he had resumed drinking and had continued it for 7 days. During this time he omitted amphetamine sulfate. However, 4 days before he had stopped drinking and resumed the medication, and he felt that the episode was over.

In more than 16 months since beginning treatment this patient had had two episodes of heavy drinking, each lasting less than a week and 7 months apart. In addition he had had two periods of 'social drinking', one lasting less than a week and limited to beer, and the other occurring during a cruise and largely limited to beer. Except for these four episodes he had had nothing what ever to drink. In other words, he had been helped so far as his day-to-day drinking is concerned.

**Case 2** The patient, a 32-year-old salesman, was first seen on July 8, 1937. He had been drinking heavily for 15 years. In the last few years, two or three times a week he had been starting to drink in the morning, and continuing throughout the day and evening, neglecting his business and his home. The episodes had been increasing in frequency.

He was started on amphetamine sulfate, 20 mg daily. On July 27 he reported that he had not had anything to drink and had had no impulse to drink. However, this was his last visit. A report from his relatives at a later date stated that he had stopped drinking for 2 or 3 months but had then begun it again.

**Case 3** The patient, a 50-year-old real estate broker, was first seen on September 22, 1937. He had been drink-

ing for 26 years, but had begun to drink heavily in the last 8 years, after his business had collapsed in the financial depression. In the past 2 years his drinking had interfered with his business and his home life. His usual course was a drinking bout lasting about a week, during which time he did not go home, but took a room in a hotel and drank gin in large quantities. These bouts usually came at intervals of 1 to 3 weeks. His longest free period in the previous 2 years had been 3 weeks, except for the 5 weeks previous to his visit, 3 weeks of this time, however, had been spent in bed with measles. He had previously been treated by psychotherapy, with no effect.

He was started on amphetamine sulfate, 20 mg daily. At the time of his last visit, on October 6, 1938, he had not had a drink of any kind since his first visit, almost 13 months before. He was still taking amphetamine sulfate, 40 mg daily. He had had no temptation to drink, in spite of the facts that his business was still in very poor condition and his domestic financial situation quite trying and that he had undergone an appendectomy, suffered the collapse of a financial scheme, and had disappointments as the captain of a squash team at his local club. He reported that during this time he had frequently been to parties where everybody else was intoxicated, but had not taken a drink.

**Case 4** The patient, a 42-year-old housewife, was first seen on September 23, 1937. She had been drinking heavily for 10 years. She drank daily, and her husband reported that she was quite constantly under the influence of alcohol. In the previous 2 years she had been for 14 months in an institution, and the early part of this time had been the only free interval in the last 5 years. Even during the latter part of her stay in the institution she drank whenever she was allowed out on parole, even on 1-day visits to town for shopping. In the 3 weeks preceding her first visit to me, her longest free interval had been 3 days.

She was put on amphetamine sulfate, 20 mg daily, and the dose was soon raised to 40 mg. For 3 weeks she continued to drink to some extent daily, although according to reports from her family the amount consumed was less than it had been. On October 15 she stopped drinking and continuing to take amphetamine sulfate went for over 2 months without drinking, except for a glass of beer on two social occasions. On December 19 she started a 3-day episode of drinking beer. During the first week of January, 1938, she again drank beer, and this time also some wine. Beginning with January 8, 1938, she went for 2½ months without drinking, except for a very rare glass of beer. On March 23 her husband, without any warning, failed to come home to dinner. She began to drink whiskey quite heavily, and continued this until April 3. She then resumed amphetamine sulfate, 40 mg daily, and went for 3½ months without any drink, not even beer. In the middle of July she again began to drink heavily, fell and broke her ankle. She took a good deal of sedative, and when seen on July 20, 1938, was suffering from acute Amytal intoxication. She was sent to a hospital and given amphetamine sulfate, and was discharged a week later, apparently recovered. The patient has not reported since that time, but on October 23 her husband stated that she had been drinking more or less steadily since her discharge from the hospital, although not so heavily as usual.

**Case 5** The patient, a 30-year-old clerk, was first seen on October 22, 1937, on the verge of delirium tremens. He

chotherapy Obviously, when such a patient talks freely this has a certain psychotherapeutic value, but no attempt at interpretation was made, and no advice was given as to organization of patients' lives or problems All the patients remained ambulatory None were confined to institutions as a part of their treatment

At the first interview, it was explained to the patient that alcoholism was a disease, and that the mere knowledge that one ought not to drink was not usually sufficient to cure it It was stressed that unless the patient *wanted* to stop drinking no one could help him, but that if he did want to the medication given would probably be of assistance in bolstering his purpose The patients were told that there was no trick or magic about the medicine, but that it was better for them not to know—at first, at least—what drug they were taking, so that they would not be influenced by anything they might hear or read in newspapers about it \*

With this preliminary, the patients were given a supply of 10-mg tablets of amphetamine sulfate and instructed to take two tablets daily, one immediately on arising and one at noon They were told that the dose might need to be adjusted, and were instructed to return in one week

Each patient was seen at weekly intervals for several weeks, then, if all went well, at two-week intervals and later once a month The patients who have been longest under treatment now report once in two or three months Doses were increased in several cases, and decreased in 1 Several patients were instructed in the course of their treatment to take an additional tablet in the late afternoon whenever they expected to be out in the evening at a place where drinking would be going on They were not asked to avoid parties, or in any fashion to modify their way of living, except as such modification developed naturally and spontaneously during their treatment

#### UNTOWARD EFFECTS

Only 1 patient (Case 14) found that the usual dose made him "jittery" and nervous and unable to sleep, he was so alarmed that he telephoned for advice He was advised to take a smaller dose and subsequently had no untoward effects In no case was there any disturbing effect Insomnia occurred infrequently, and was transient There was no marked loss in weight, no increased nervousness, no loss of appetite, no rise in blood pressure and indeed no other unpleasant accompaniment

There has been no evidence whatsoever of ad-

diction or habit formation Several patients spontaneously suggested omitting the pills, and a few actually did so without being told None have given any sign, consciously or unconsciously, of a need to continue the drug, such as would be present if a habit had been formed or a true addiction had occurred

#### RESULTS

In all, 21 cases were treated, including 4 seen by Dr Marjorie Meehan, of Princeton, New Jersey, at my suggestion I am greatly indebted to Dr Meehan for permission to include these cases here

In 5 of my cases and 3 of Dr Meehan's, the patients took no alcohol in any form after beginning treatment, at the present time, these periods of abstinence vary from two weeks to thirteen months, and are more than four months in 6 cases In 14 cases of the entire series the results may be considered reasonably successful either the patients abstained entirely, or their drinking habits were so modified that they were able, by and large, to resume their places in the family and business world, even though they suffered one or two lapses from total abstinence In only 4 cases (Cases 2, 7, 15 and 16) was there total failure, and even in 3 of these there was a short period of abstinence In all the others there was a period of abstinence significantly longer than any free interval in the year or two preceding treatment

Evaluating the results in another way and estimating the length of abstinence under amphetamine sulfate as compared with pre-treatment abstinence, we find that in 15 of the 21 cases the abstinence period was at least six times as long as the usual free interval before treatment (not counting, of course, those free intervals which were due to hospitalization) Of the remaining 6 cases, 3 (Cases 14, 17 and 21) have remained completely abstinent, but have not yet been under treatment for as long as six times their pre-treatment free interval

It has been stated by most patients whose treatment can be called successful that they have no desire to drink They feel alert, energetic and able to do their work and face their difficulties They say that they no longer need the support of alcohol, and consequently have no temptation to drink

#### CASE REPORTS

*Case 1* The patient, a 45 year-old man, a retired executive, was first seen on June 29, 1937 He had been drinking heavily for over 12 years During this time he had been treated at most of the sanitariums and hospitals of New England, and was known to many psychiatrists In the previous year his longest free period—one without a

This work was begun at about the time when amphetamine sulfate was receiving a good deal of undeserved and unfavorable publicity as pep

**Case 11** The patient, a 40-year-old broker, was first seen on May 10, 1938. In recent years he had drunk  $\frac{1}{2}$  to 1 quart of whiskey daily, with the longest free interval 2 or 3 days, except for one period of about 6 months ending 2½ months before his visit, and including a time when he had been sentenced to the State Farm as a common drunk at the instance of his family.

The patient was put on amphetamine sulfate, 20 mg daily. On September 29 he reported that he had had no alcohol whatever, except one glass of beer on a very hot day in July, when he had no desire to take any more. He felt more energetic and got a great deal of work done, both in his business and in physical labor around his house. He had been to two college reunions and one high school reunion, all of which he characterized as drunken brawls, but had not had anything to drink at any of them. Even the serious illness and death of his father, who had been found to have a carcinoma about 2 months before, had not tempted him to resume drinking.

**Case 12** The patient, a 33-year-old housewife separated from her husband and unemployed, was first seen on May 16, 1938. She had been drinking heavily for 3 years. She drank gin or whiskey, about 1 pint daily, and had had a drink every day for the past 6 months, with an excessive bout about 1 month previously. She drank because she became depressed. She had not had a drink for 2 weeks.

She was started on amphetamine sulfate, 20 mg daily. On June 20 she reported that she had had nothing to drink except for two glasses of beer about 3 weeks before. She felt well, and much encouraged about her domestic situation. She had taken up to 40 mg of the drug daily, but was then down to 10 or 15 mg. She has not returned for a further interview.

**Case 13** The patient, a 42-year-old unemployed insurance broker, was first seen on May 16, 1938. He had been drinking heavily for 18 years. His drinking episodes lasted for 2 or 3 weeks and occurred at intervals of 6 or 7 weeks. During sprees he drank about a quart of whiskey a day. He had been discharged from the Boston City Hospital 10 days previously, after recovery from an attack of delirium tremens.

He was put on amphetamine sulfate, 20 mg daily. On October 17, when last seen, he had not had a drink for 5½ months and felt that he had beaten his problem, since his longest free interval in many years before starting treatment had been 8 weeks. He was working on the WPA, was enjoying his work and felt well. He was taking 30 mg of amphetamine sulfate daily.

**Case 14** The patient, a 30-year-old unemployed man, was seen first on May 24, 1938. He had been drinking for 15 years, heavily in the last 4 or 5 years. He had gone on sprees lasting for 3 weeks every 2 or 3 months, and averaged 1½ quarts of whiskey per day during them. In the last 2 years his longest free interval had been 3 months. He had had his last drink about 1 month before, after a 3-week drinking bout.

The patient was put on amphetamine sulfate, 20 mg daily, and showed an apparent susceptibility to the drug. Two days after he started treatment he was called to his home during the night. The pills had made him nervous, so he had taken more of them. He had had about 150 mg in the 2 days, was unable to sleep and was trembling pale and clammy. The drug was discontinued and he recovered within 36 hours. He was put on daily doses of 10 or 15 mg.

When seen on September 19 he said that he had not had anything to drink for over 5 months. He had been

somewhat erratic in taking the drug since he had found that a full dose caused insomnia. On the day of this visit he felt that he wanted a drink for the first time but had fought it off. He had not been taking amphetamine sulfate in the preceding 2 weeks.

On November 3 he reported that the drug taken on September 19 had tided him over his temptation and that he subsequently had not had a drink. He had been working fairly regularly.

**Case 15** The patient, a 32-year-old WPA truck driver, was first seen on August 1, 1938. He had been drinking heavily for 10 years, usually over each week end, consuming a quart of whiskey and a good deal of beer on each occasion. His longest free interval in the past year had been 2 weeks. His longest free interval in the last several years had been 3 months, in 1935.

He was put on amphetamine sulfate, 20 mg daily.

He has not returned. His wife reported on October 15 that he took one pill in the morning for about 3 weeks, and 4 days after beginning the treatment developed insomnia, he drank about once a week, but not heavily. At the end of this period he stopped taking the drug and went on a prolonged alcoholic spree. Since then he had been drinking about as heavily as usual.

**Case 16** The patient, a 26-year-old man, was first seen on August 1, 1938. He had been drinking heavily for many years, taking 1 to 2 quarts of whiskey daily, in sprees lasting several weeks and occurring every few months. At the time of this visit he had not had a drink for 10 days, but before that had been drinking steadily for 5 weeks, after a free period of 2 months.

He was put on amphetamine sulfate, 20 mg daily. On August 22 he reported that he had drunk nothing and had had no desire to drink. He felt extremely well. On November 3 his foster mother reported that for 1 month after starting treatment the patient had stopped drinking. Then he had begun to drink erratically and refused to take any more amphetamine sulfate.

**Case 17** The patient, a 38-year-old chauffeur, was first seen on September 13, 1938. He had been drinking heavily for many years. He drank gin, whiskey or pure grain alcohol, usually in a bout lasting 2 weeks and occurring every 2 months, he averaged 2 quarts daily during the bouts. He was obviously drunk when seen.

He was put on amphetamine sulfate, 20 mg daily. On September 21 he reported that, apparently because under the influence of alcohol when he received his instructions, he had misunderstood them, and had taken about fifteen pills (150 mg) the day after his visit in trying to get over his shakiness, supposing that the medicine was a sedative. His heart began to pound, a pulse beat in his stomach and he did not sleep that night, but there were apparently no other ill effects, and by the next morning even these vascular effects were gone, although he felt nervous and shaky. He had taken all his pills except one, so that he had none to take during the rest of the interval between visits. On the 4th day after the first visit he had had two drinks but no other alcohol. The terms of dosage were made clear to him. On October 7 he reported having drunk no alcohol since the last visit, except for a glass or two of vermouth at a party. He was taking 20 mg of amphetamine sulfate daily, with another 10 mg in the evening twice each week. He believed that he would be drinking if it were not for the pills—he still wanted to drink, but the pills helped him fight off the desire. He felt that the morning pill quieted him. He said that his internal tension was relaxed. He was working and ate and slept well.

had been drinking for 10 years or more, and quite heavily for the preceding 2 years. He drank beer and whiskey. In the previous 6 months he had been drinking heavily and almost continuously, with the longest free interval 6 days. Before this period, however, he had gone for 5½ months without a drink.

He was put on amphetamine sulfate, 20 mg daily, and for 2 weeks stopped drinking. He failed to report for the next 3 months. On February 8, 1938, he reported that he had been drinking heavily, almost since his last visit. He had taken no pills during this period. He again was very nervous and fearful.

The patient was again put on amphetamine sulfate, but did not return until 4 months later, when he drifted into the outpatient department of a Boston hospital. He was examined, recognized as my patient and returned to me. He was again fearful and nervous and on the verge of delirium. He said he had taken the pills for 3 weeks after his previous visit, and had not had a drink for 2½ months, but had then begun again.

He was again put on amphetamine sulfate. On August 4 he reported that he had gone for 6 weeks without a drink, except for some beer on a very hot evening a few days before, and that he still continued to take amphetamine sulfate. He has not reported since, but on October 20, 1938, his mother stated that he had not had a drink for many months and was working regularly. She said he had not been taking the pills recently.

**Case 6** The patient, a 40-year-old housewife, was first seen on November 16, 1937. She had been drinking for 5 years, usually on spruces lasting 2 or 3 weeks and recurring every 3 months. In the past year her husband had been ill and her son had been sent to prison. She was on the verge of delirium tremens.

She was started immediately on amphetamine sulfate, 20 mg daily. On December 16 she reported that she had had nothing to drink since the treatment was started. She was told to take the pills only on those days when she felt discouraged or that she might want a drink.

On October 13, 1938, 11 months after beginning treatment, the patient's husband reported that she had gone for 9 months without a drink. In the previous 2 months, however, he said that there had been two drinking episodes. She had not taken amphetamine sulfate for several months.

**Case 7** The patient, a 58-year-old retired business man, was first seen on January 4, 1938. He had taken alcohol for 40 years. In the previous 4 years, since his wife's death and since his daughter had left him, he had been drinking heavily. He drank whiskey, and averaged 10 ounces a day, with 16 ounces on heavy days and 6 ounces on light ones. There were no free days. All available forms of treatment had been tried without success.

The patient was put on amphetamine sulfate, 50 mg daily. He has never returned. Two weeks after his visit he reported by telephone that the pills helped somewhat but that he had not stopped drinking.

**Case 8** The patient, a 63-year-old business man, was first seen on January 31, 1938. He had been drinking heavily during the previous 5 years, he drank gin, in spruces lasting several days and occurring every 2 or 3 weeks. He thought that his bouts began when he was lonely or depressed. His drinking became worse when his wife died and his sons left him alone in his home.

The patient was put on amphetamine sulfate, 20 mg daily. He went for 3½ months without a drink, and one of his sons reported that he was greatly improved in every respect and had renewed some of his old interests and

friendships. On May 24 he reported that a month or 6 weeks previously he had felt so much better and so confident that he had stopped taking the pills. Several weeks before this visit he had pulled a muscle in his back. This was very painful, but neither his son nor his physician appreciated how painful it was, and were not very sympathetic. As a result, according to him, he had begun drinking a week before his visit. Amphetamine sulfate was started again, and he continued without a drink through a European tour.

On October 21 his son reported that he had again stopped taking the pills. A month previously, after the New England hurricane had blown down most of his trees, he had had another drinking episode lasting 2 or 3 days, but had then stopped and resumed medication. The son added that his father occasionally had a drink when he came to town to visit, but did not get drunk and did not continue his drinking on the following day.

**Case 9** The patient, a 44-year-old insurance broker, was first seen on March 9, 1938. He had been suffering for many months from a parotid tumor, but was so fearful that he could not bring himself to consult a physician about it. Finally he went to a surgeon, who recommended operation, but because he was drunk and had been drinking heavily for some time and because the tumor was obviously a benign one, he was referred to me for preliminary treatment.

The patient had been drinking heavily for many years. For the previous 3 or 4 years he had been drinking 1½ to 2 quarts of whiskey per day quite regularly. He admitted having had many hypochondriacal ideas, and said that he had begun drinking heavily in an attempt to overcome these various pains and aches. He was depressed and fearful.

He was put on amphetamine sulfate, 20 mg daily, and on March 16 this dose was increased to 40 mg. On April 20 he reported that he had had only one highball since starting treatment, and that in the 1st week. He had been drinking a glass or two of sherry every day, but had had nothing stronger, nor had he been at all intoxicated since beginning treatment.

On May 2, 1938, the parotid tumor was excised. The patient has not since returned, but on October 26 his mother reported that he was getting along very well, and so far as she could tell he was not drinking. She said that she did not know whether he was continuing to take the drug.

**Case 10** The patient, a 40-year-old housewife, was first seen on March 15, 1938. She had been in a serious automobile accident 4 years before, when the person sitting beside her was killed, and had since suffered from phobias and an anxiety state. She had begun to drink in an effort to overcome these, and had been drinking steadily and heavily. She had been taking about a pint of gin a day, with no free days until a week before her visit, when she had become tremulous and terrified, and had heard voices for an hour. She had had no alcohol since that time. When seen she was on the verge of delirium tremens, and in addition, tenderness of the muscles and weakness suggested an early peripheral neuritis.

She was put on amphetamine sulfate, 20 mg daily, and on adequate treatment for her vitamin deficiency. She stopped drinking entirely. On August 15 the patient's physician reported that she had had nothing to drink until about August 1, a period of 4½ months, she had then drunk for a short time, after an acute financial crisis, but had stopped drinking after a few days. She later reported that the fears seemed lighter and easier to bear when she was taking the drug.



portant. Because of the experimental aspect of this study, no attempt has been made to take advantage of the situation. However, it is my belief that the greatest benefit from the use of amphetamine sulfate in alcoholics will arise out of this circumstance. The free interval which amphetamine sulfate appears able to produce should allow time for the institution of more fundamental psychotherapeutic approaches. Probably the real value of the treatment will prove to be just this opportunity to inaugurate psychotherapy on a basis of good rapport and confidence and sobriety, so that the gain made by the treatment may be consolidated by more fundamental modifications of the alcoholic's personality and his attitude toward life.

One or two of the patients in this series, in common with many other chronic alcoholics, have been addicted to barbituric acid compounds, and amphetamine sulfate has been of help to them in this respect. In addition, certain experiences with amphetamine sulfate in acute drug comas have been suggestive. It appears that another valuable use of the drug may well prove to be in the treatment of drug addictions, including both the barbiturates and the morphine derivatives, and studies of its value in these cases should be undertaken.

#### SUMMARY

A method for treating chronic alcoholism with amphetamine (Benzedrine) sulfate is presented.

Reports of 21 cases so treated are given.

It is concluded that the method is of great value in the treatment of chronic alcoholism.

It is suggested that the use of amphetamine sulfate may permit a sufficient interval of sobriety for the institution of the usual and more fundamental psychotherapeutic methods.

It is pointed out that amphetamine sulfate may be useful in the treatment of drug addictions, and its employment therein should be investigated.

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The following 4 cases were treated by Dr Meehan

*Case 18* The patient, a 43-year-old man, had been drinking fairly heavily since the age of 17. Before Prohibition he frequently took a pint of whiskey before breakfast. Nevertheless, his drinking did not interfere with his work and he was successful as a skilled mechanic until the age of 39. At this time he began to become intoxicated more frequently. He lost much time from work, was abusive to his wife, harsh to his children and neglectful of home responsibilities. He was arrested for drunkenness several times, and was finally sent to a state hospital in April, 1937. He apparently showed no signs of alcoholic psychosis, however. He remained in the hospital for 6 weeks. After discharge he remained sober for a few months and then began drinking more heavily than ever. He was returned to the state hospital in December, 1937, and remained there until March, 1938. On discharge he immediately resumed drinking to excess.

He was first seen May 25, 1938, at the requests of a social worker and of his wife. At this time he was markedly intoxicated and thoroughly unco-operative. A few days later he was persuaded to try amphetamine sulfate 10 mg twice daily. He stopped drinking immediately. His disposition improved. Whereas formerly he had taken no interest in the home, he began to repair the furniture, help his wife with her work and volunteer to do errands. He said that he felt better than he had ever felt before. After taking 20 mg daily for about 3 weeks he began to notice occasional nausea. At this time the dose was reduced to 10 mg daily, before breakfast. He continued this for 2 weeks longer, during which time his condition continued excellent. He then discontinued the medicine entirely. On September 23 he said that he had not taken any amphetamine sulfate or other medication since early July, but had had no desire to drink. The change in his personality had continued, and both he and his wife agreed that his condition could not have been better.

While taking the amphetamine sulfate the patient not only had no desire to drink, but the sight or smell of alcoholic liquor was extremely disgusting to him. Since discontinuing the medication, he no longer experienced this disgust, but merely had no interest in or desire for alcohol.

*Case 19* The patient, a 43-year-old woman, was the wife of the patient in Case 18. When she married at the age of 20 she was at first disgusted by her husband's drinking. Gradually, however, she began to drink with him. This did not become serious until she had reached the age of 38 or 39, when husband and wife both began to drink very heavily. The children were frequently neglected, and on several occasions the police intervened. The patient insisted that she only drank to keep her husband company and to find relief for her worry about his drinking, and never really enjoyed it. However, she finally was sent to a state hospital in December, 1937, and remained there until April, 1938, without apparent psychotic symptoms. On discharge from the hospital she started drinking again. The two children had been placed in an institution during the hospitalization of the parents. When the mother returned from the hospital she took the 12-year-old boy back to live with her and her husband in furnished rooms, but gave him relatively little attention. She refused to take the 2-year-old child.

She was first seen May 25, 1938. At this time she was sober but extremely tense. She was pale and trembling. She was eager to try any treatment, and enthusiastically

welcomed the suggestion of taking amphetamine sulfate, 10 mg twice daily. She continued this for 3 weeks and then reduced the dose to 10 mg before breakfast, 2 weeks later she discontinued the medication entirely. On September 23 she reported that she had had no alcohol and no desire for it since beginning treatment. She had re-established her home with both children and was taking excellent care of house and family. She said she felt very well.

*Case 20* The patient, a 47-year-old Negro, had been drinking heavily all his life. It was impossible to find out what quantity he had taken, but he had been known as one of the worst drunkards in town. He worked irregularly and spent whatever he earned on liquor. He came only at the insistence of his wife, who threatened to leave him unless he took treatment, and had no expectation of being helped.

On June 24, 1938, he began taking amphetamine sulfate, 10 mg twice daily. He reported 1 week later that he had been taking the tablets regularly and felt better than he had for years. Whereas formerly he was occasionally short of breath in the mornings, this symptom had now completely disappeared. He had not had any wine or whiskey to drink and had had no desire for them. However, he had had several cans of ale, which he enjoyed. His wife reported that he had not been intoxicated, that he had brought money home for the first time in years, and that he was much pleasanter to her and his two sons than he had been previously. However, she noted that he was more restless than before and wanted to be constantly active. He continued taking 20 mg of amphetamine sulfate daily until early September, when on two occasions he had momentary dizzy spells. The dose was reduced to 10 mg daily, and up to September 22 he had had no more spells. He drank three or four cans of beer or ale a week, but no wine or whiskey, and had not been drunk.

*Case 21* The patient, a Negro, was referred by police. He had been drinking in moderate amounts since childhood. In recent years the craving had increased and intoxication was more frequent. He was eager to be cured. On August 31, 1938, he began taking amphetamine sulfate, 10 mg twice daily. Desire for drink stopped immediately. He had been taking ale occasionally but was satisfied by one glass. His wife has reported that he had not been drunk and his disposition had improved remarkably. On September 12 the dose was reduced to 10 mg before breakfast and 5 mg before lunch.

#### COMMENT

It would be over-sanguine to assume that amphetamine sulfate can alone solve the problem of alcoholism. In almost all the cases in this series the patients have gone through a more or less prolonged period of greater accessibility, due to their sobriety. If one assumes that the patients in this group who have been most successful represent those who were really anxious to stop drinking, but had been unable to do so without external assistance, the improved rapport between patient and psychiatrist is understandable, when the patients find that they have actually been able to stop drinking. The fact that this has been accomplished without hospitalization is also quite im-

**Revolution** In varying degrees, perhaps least of all in religious life, the career of the humanitarian student has become inseparably linked with the financial and industrial domination of the present era. Nowhere, however, is this loss of material and economic simplicity more in evidence than in the discipline of science—an inevitable occurrence, of course, since scientific discoveries themselves had so much to do with making possible the Industrial Revolution.

Scientific study and practice have been profoundly affected by modern materialism in two ways. The first is that even in the pursuit of pure scientific knowledge, guided by the highest ideals of natural philosophy, the average student is helpless without the aid of costly and elaborate equipment. The second and more important effect is that the entrepreneur class has subsidized scientific endeavor, to the end that the entirely modern study of applied science has been created largely to meet the needs of industry.

Applied science, from the standpoint of men, money and materials, dominates scientific education today. It capitalizes when necessary the principles of natural philosophy, but it shuns that ancient discipline's academic tradition of the pursuit of knowledge for its own sake. Frankly and unashamedly commercial, dominated by the entrepreneur spirit, it attracts its numerous students because of the distant promise of highly paid industrial positions. The prototype of the average scientific student of today is not, as may be popularly supposed, Leonardo da Vinci or Galileo, but rather the skilled artisan and the guildmaster of the machineless past.

The scientific method has been irrevocably appropriated by artisans and merchants as a means of profit, and from this action have resulted numerous material blessings, but as with any unfinished scientific experiment, the whole matter does not yet permit unqualified praise or condemnation. This much is certain, that with education pointing the way we must strike a compromise in order to ensure the continuance of worldly progress as the servant and not the master of the high mortality inherent in the cultural discipline which made it possible.

In no field of scientific endeavor is the necessity for such a compromise more clearly indicated than in medical science. Our failure here to bring progress under the control of an older and wiser cultural tradition cannot be otherwise than fatal to the successful continuance of an institution founded on the ideals of service and truth.

That part of modern scientific medicine which is represented by the training and practice of physicians bears a peculiar relation to the develop-

mental changes in the rest of cultural learning that have been discussed. We find here a professional group which, in theory at least, exists for the primary purpose of fulfilling a rigorous set of moral obligations which have remained unchanged throughout the centuries. Under present-day conditions, however, in order that it may perform its function efficiently the medical profession is forced to depend heavily upon the services of the practical scientist and the entrepreneur. From these two come the costly and intricate instruments, the methods of organization and mass production, the endowments and capital and the maintenance of a large lay personnel, which in conjunction with traditional medicine have brought into being the most complete and extensive system of medical care ever known. Expressed in another way, the skilled craftsman and the business man have invaded an ancient branch of natural philosophy, and have made possible one of the most dramatic civilizing contributions that the world has seen.

The brilliance of this achievement should not blind us to the danger inherent in a system of medical care that entrusts so much of its vital functioning to agencies which admittedly work for selfish and materialistic purposes. Sir William Osler recognized this danger when he wrote, "Great material prosperity has weakened the influence of ideals and blurred the eternal difference between means and end." That which Osler had the foresight to fear a generation ago is even more apparent today. If we examine in detail the economic aspects of the development of modern medicine, we shall find factual proof that before the sheer weight of dollars and man-power, medical men are in a vulnerable position in so far as their capability of maintaining the directional control of their science is concerned.

The physical instruments and the economics of medical care, as might be inferred from what has been said of early natural science, were once of a very primitive type. Of the total amount of money formerly required for medical purposes, by far the greatest proportion was paid for intangibles—service and advice. The cost of drugs no doubt figured significantly, but to no greater extent than it does today. The cash value of instruments was negligible. Hospitals were few. Dentistry such as we now have was unknown. There was no true profession of nursing, friends and relatives performed this task gratuitously. There was no public-health work to speak of, and what did exist included no preventive medicine. From these facts we conclude that in days gone by, practically every penny of each dollar of medical purchasing power was paid to physicians in pri-

## THE CONTROL OF MEDICAL SCIENCE\*

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EVERY historical period has its false prophecies, its specious beliefs and its ignoble ideas which when followed long enough may destroy individuals, classes, nations or even entire civilizations. Twentieth-century America is no exception. Here we find that by a special combination of historical circumstances, a certain erroneous belief has become more prevalent than ever before in the history of the world. This false doctrine is that the perfection of the individual or the social group or its cultural standards can be measured in terms of material prosperity. America has made a cult of applied science, and her people worship the high priests of practical invention, industry and finance. More smugly even than the Pharaohs gazing at their pyramids, we Americans look upon our skyscrapers, our automobiles and our gadgets and acclaim the peak of civilization. As completely as did any handful of gilded nobility in the past, we neglect great moral truths—those specific attributes of civilized man which invariably determine the historical destiny of individual, race and nation.

The moral fiber of a civilization, composed of its ethical standards, its social justice, its tolerance, its achievements in pure science and the arts, is preserved by its educational system. Teaching may take the form of the pronouncements of a patriarch across a desert campfire, or of innumerable weighty lectures delivered at a great center of learning. No matter what the external guise, however, education fulfills its role as the perpetuator of cultural standards only to the extent that it presents disciplines. Of these, four are of outstanding importance: theology, jurisprudence, literature and natural science. When we recall the perfection of the Golden Age of Greece, we can appreciate that to teach a philosophy of life and a rational legal code and esthetics and to stimulate an intelligent curiosity about natural phenomena will bring glory to the human race in the absence of the superadded features of modern education.

The four cardinal disciplines referred to exemplify purely cultural learning. Throughout their history they have had much in common, and even today, beneath our technocratic exterior, they are firmly united as the backbone of education. Yet in recent times they have begun to lose in

varying degrees one of their formerly outstanding mutual characteristics. This is the physical simplicity by which all forms of cultural learning were once acquired and practiced. I do not mean by this that their actual indoctrination was intellectually an easy task. I refer to the fact that law, philosophy, science and religion could be taught and applied without the use of tools and instruments. When Jesus instructed His followers: "For where there are two or three gathered together in my name, there am I in the midst of them," he stressed the simplicity of religious practice, but such was also the pattern of all other cultural endeavor. A teacher, disciples, a few authoritative writings and the world of observable nature were the only requisites for work in theology, law, literature and science. A bible and a congregation sufficed for the man of God, codes and precedents for the jurist. The literary man needed only a library and writing materials, and the natural scientist—also the physician of those days—depended more upon the acuity of his own senses than upon his few rough tools.

We may attach considerable importance to this independence of cultural learning of material instruments, for the reason that it had the indirect effect of creating a sharp distinction between scholarly endeavor and commercial acquisitiveness. There was no reason why the financial affairs of men of learning should be more involved than those of the most primitive kind of merchant. Their professional overhead was low. Priest, lawyer, physician and author spent relatively small sums for education and for professional maintenance. In a sense they were public employees who received fees, taxes or tithes in return for which they gave neither product nor merchandise, but an entirely intellectual type of service. This unsophisticated economic relation between the professions and the buying public was not the commercial one which exists today between producers and consumers. Although money changed hands, practically none of it represented capital goods or consumers' goods. The only merchandise was intangible, consisting of ideas, advice, theories and guidance.

Now, it would indeed be remarkable if these simple economic affairs of what we may call the professional class failed to be affected by the tremendous changes arising out of the Industrial

**Revolution** In varying degrees, perhaps least of all in religious life, the career of the humanitarian student has become inseparably linked with the financial and industrial domination of the present era. Nowhere, however, is this loss of material and economic simplicity more in evidence than in the discipline of science—an inevitable occurrence, of course, since scientific discoveries themselves had so much to do with making possible the Industrial Revolution.

Scientific study and practice have been profoundly affected by modern materialism in two ways. The first is that even in the pursuit of pure scientific knowledge, guided by the highest ideals of natural philosophy, the average student is helpless without the aid of costly and elaborate equipment. The second and more important effect is that the entrepreneur class has subsidized scientific endeavor, to the end that the entirely modern study of applied science has been created largely to meet the needs of industry.

Applied science, from the standpoint of men, money and materials, dominates scientific education today. It capitalizes when necessary the principles of natural philosophy, but it shuns that ancient discipline's academic tradition of the pursuit of knowledge for its own sake. Frankly and unashamedly commercial, dominated by the entrepreneur spirit, it attracts its numerous students because of the distant promise of highly paid industrial positions. The prototype of the average scientific student of today is not, as may be popularly supposed, Leonardo da Vinci or Galileo, but rather the skilled artisan and the guildmaster of the machineless past.

The scientific method has been irrevocably appropriated by artisans and merchants as a means of profit, and from this action have resulted numerous material blessings, but as with any unfinished scientific experiment, the whole matter does not yet permit unqualified praise or condemnation. This much is certain, that with education pointing the way we must strike a compromise in order to ensure the continuance of worldly progress as the servant and not the master of the high mortality inherent in the cultural discipline which made it possible.

In no field of scientific endeavor is the necessity for such a compromise more clearly indicated than in medical science. Our failure here to bring progress under the control of an older and wiser cultural tradition cannot be otherwise than fatal to the successful continuance of an institution founded on the ideals of service and truth.

That part of modern scientific medicine which is represented by the training and practice of physicians bears a peculiar relation to the develop-

mental changes in the rest of cultural learning that have been discussed. We find here a professional group which, in theory at least, exists for the primary purpose of fulfilling a rigorous set of moral obligations which have remained unchanged throughout the centuries. Under present-day conditions, however, in order that it may perform its function efficiently the medical profession is forced to depend heavily upon the services of the practical scientist and the entrepreneur. From these two come the costly and intricate instruments, the methods of organization and mass production, the endowments and capital and the maintenance of a large lay personnel, which in conjunction with traditional medicine have brought into being the most complete and extensive system of medical care ever known. Expressed in another way, the skilled craftsman and the business man have invaded an ancient branch of natural philosophy, and have made possible one of the most dramatic civilizing contributions that the world has seen.

The brilliance of this achievement should not blind us to the danger inherent in a system of medical care that entrusts so much of its vital functioning to agencies which admittedly work for selfish and materialistic purposes. Sir William Osler recognized this danger when he wrote, "Great material prosperity has weakened the influence of ideals and blurred the eternal difference between means and end." That which Osler had the foresight to fear a generation ago is even more apparent today. If we examine in detail the economic aspects of the development of modern medicine, we shall find factual proof that before the sheer weight of dollars and man-power, medical men are in a vulnerable position in so far as their capability of maintaining the directional control of their science is concerned.

The physical instruments and the economics of medical care, as might be inferred from what has been said of early natural science, were once of a very primitive type. Of the total amount of money formerly required for medical purposes, by far the greatest proportion was paid for intangibles—service and advice. The cost of drugs no doubt figured significantly, but to no greater extent than it does today. The cash value of instruments was negligible. Hospitals were few. Dentistry such as we now have was unknown. There was no true profession of nursing, friends and relatives performed this task gratuitously. There was no public-health work to speak of, and what did exist included no preventive medicine. From these facts we conclude that in days gone by, practically every penny of each dollar of medical purchasing power was paid to physicians in pri-

vate practice. They in turn used this income almost entirely for personal ends, requiring only a small amount for professional overhead expenses.

Under modern conditions, medical science has become much more comprehensive, and is no longer synonymous with the activities of the handful of men comprising the regular medical profession. Of all the persons engaged in supplying the medical needs of this country, only one in nine is a licensed physician—a ratio which would be even lower if the total included the employees engaged in selling and manufacturing drugs and instruments. This huge auxiliary army of medical workers and the institutions which it represents absorb about 70 per cent of the money spent annually for medical purposes. The remaining 30 per cent represents the gross amount paid to physicians in private practice, of which an unestimated but indubitably large proportion is in turn required for overhead expenses, and is thus added to the 70 per cent just mentioned.

The traditional belief that the practicing physician is the central and controlling figure in our system of medical care is taken for granted by medical men and approved by the majority of the general public. Neither appear to realize, as is clear from the statistics just quoted, how tenuous is the arithmetical basis upon which the supposed hegemony of the regular medical profession is founded. Representing about a tenth of the manpower and less than a third of the financial power concerned in the administration of medical care, physicians will require vastly more legal and regulatory authority than they now have if they are to continue to control medicine in fact as well as in theory.

Now, the 70 per cent of the medical budget not destined for practicing physicians is subdivided as follows: hospital facilities, 23 per cent, drugs (including patent medicine), instruments and miscellaneous, 20 per cent, dental care, 12 per cent, irregular practitioners, cultists, quacks, and so forth, 7 per cent, nursing care, 5 per cent, and public-health work, 3 per cent. That a considerable part of this money is now being spent as wisely and efficiently as it could be under any other system of medical care is unquestioned, it is equally true that its allocation is partially approved, even if not actually controlled, by the medical profession. By far the larger amount, however, is in the hands of lay people. Many of these, flagrantly contradicting the medical profession's own ideal of service, profit by the needs of universities, physicians and patients for medicines, instruments and laboratory equipment, selling this necessary material on the commercial basis of

charging all that the traffic will bear. Real estate, automobiles and building materials—as vital to modern medicine as is scientific equipment—are rarely acquired without some “humanitarian” realizing his 5 to 20 per cent margin of profit. Despite the physicians' avowed influence in hospital affairs, politicians, trustees and unpredictable dispensers of charity too often have actual control of the working of these institutions. A notorious evil, of course, is the relentless grasp of the politician upon the public-health work of many states and municipalities.

Nowhere, however, is the misdirection and tragic wastefulness of precious medical funds more glaringly revealed than in the profitable patent-medicine trade and the activities of irregular practitioners. The palpable charlatan and the vendor of cheap nostrums to the ignorant poor have been parasites on medical science for centuries, but our streamlined industrialized society makes possible an ultrasophisticated brand of knavery that befuddles university presidents and often misleads the medical profession. Protected by the dawdling of legislators and the inadequacy of existing federal laws, capitalizing the popular prevalence of an inaccurate scientific terminology, aided by the great majority of drugstore proprietors and by a few renegade physicians, these pseudoscientists have erected a “front” of respectability which deceives everybody except the trained physician. Many of the most respectable newspapers and magazines as well as broadcasting stations suffer no moral qualms when they accept the remunerative advertising of these near-criminals, and as the mythical ailments grow more numerous and the ballyhoo louder, the gullible public squanders 15 per cent of the total fund it can afford for all medical purposes, in return for which it receives dearly bought spiritual comfort, a mess of worthless compounds and far too often a dose of deadly poison or an equally fatal diagnostic error.

The price of quackery is not limited to the percentage just quoted,—which does not indicate the extent of certain commercial activities not directly related to medical care, but which, in a utopian society, would be under medical jurisdiction. Such are the cosmetic industry, and that part of food merchandising which stresses medical facts in its advertising. Scientific supervision of these matters would undoubtedly divert millions of dollars into more useful channels, possibly in satisfaction of legitimate medical needs.

It would appear from all that has been said herein that a profitable way to improve our system of medical care along social and economic lines would be to devise means by which trained

medical men would be granted legally enforceable supervision over a much greater part of the nation's medical budget than they have at present. It is an axiom of leadership that one who aspires to a position of high command must first show himself capable of a greater degree of self-control than he would expect of obedience from others. Before the medical profession asks the public for the stewardship of the whole program of medical care, it must make certain that it already controls its own special province in a manner consistent with its great moral traditions.

The aspirations of the most noble institutions are confined to the limits of human frailty, there never was or will be a system of medical practice in which every otherwise legitimately qualified practitioner lives up to the ethical standards of the group as a whole. Nonetheless, in order to obtain even a minimum of subservience to ideals, we must pay the price of eternal vigilance over the moral conduct of each professional generation.

Outwardly the American medical profession would appear to have raised its standards to the highest point in history, as shown, for example, by its self-imposed regulations governing medical education and hospitals. These are laudable tendencies, but we must keep in mind that regulations, no matter how strictly enforced, will not of themselves inculcate a feeling of moral responsibility. During this period when the intellectual and technical excellence of the profession is being raised to higher and higher levels, there has occurred simultaneously ever so slight a relaxation in the vigilance exercised over its spiritual standards. At a time when university education has been seized by the trader-artisan class for the purpose of expediting its virtuous acquisition of worldly goods, medicine's ideal of service requires reiteration and splendid, living examples as never before in its history.

The recent medical graduate is usually more conversant with the history and philosophy of capitalism than he is with the cultural background of his own field. If he has to struggle very hard to build up a practice, it is only too probable that he will make use of shopkeepers' ethics before many years have passed, or he may from the very outset have been one of that increasing number of applicants for medical train-

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The medical profession has, from time out of mind, disclaimed the acquisitive motive. If it is to be true to its high calling, the interests of patients and of physicians alike demand that it be kept out of business.

Here is the heart of the problem of the organization of medicine. A profession has, quite by an historical accident which was not foreseen, fallen into a world of business and is making the adaptation which seems necessary to survival. It has all come about so slowly and so much by stealth that the program of control essential to the maintenance of the integrity of the traditional ideal could not be formulated. As a result the older order of 'private practice' is being transformed into a system of competitive enterprise, which no one has consciously willed and which in insidious ways interferes with the great social task which medicine is to perform.

'The great social task which medicine is to perform'—our generation will do well to bear these words in mind. Medicine has, of course, always performed a remarkable social service—never as a consciously willed result, but only as the incidental outcome of its attention to the individual patient. The "great task" facing us is to make deliberate use of medical science as an instrument of social benefaction. As we find it today, this instrument is an unwieldy affair only partly controlled by physicians, and to a still lesser extent dominated by the traditional medical ideal of service. Who will guide it and by what principles when the future brings an irresistible popular demand that it be used for social purposes? We younger medical men know the proper answer to these questions, let us begin early, first by leading exemplary professional lives, and next by taking a keen interest in the political, social and economic life about us, to prepare ourselves for the intelligent manipulation of a mighty implement which it will one day be our great responsibility to control.

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ACUTE HEMOLYTIC (LEDERER'S<sup>2</sup>) ANEMIA\*

## REPORT OF A CASE

THOMAS H. MCGAVACK, M.D.†

NEW YORK CITY

THE syndrome of acute hemolytic anemia described by Lederer in 1925<sup>1</sup> has become a distinct clinical entity, characterized by its occurrence in patients under thirty, the absence of any familial blood dyscrasia, a sudden onset, high fever, a rapidly appearing severe macrocytic anemia with reticulocytosis, marked leukocytosis, negative blood cultures, and often complete remission following a single transfusion. The present report deals with a case varying in certain major respects from the above picture, particularly in its complete failure to respond to repeated transfusions.

## CASE REPORT

A J (No D345 37), a 17 year-old girl, was admitted to the hospital on January 16, 1937, complaining of weakness and pain in the left upper quadrant of the abdomen. She stated that she had been well until December 24, 1936, when she developed an upper respiratory infection, associated with fever, mild coryza, sore throat, generalized aching, non productive cough and weakness. Except for the weakness, these symptoms all disappeared in a few days. On January 5, 1937, there had been a return of the fever, associated with a dull, cranial headache and followed in 24 hours by deep jaundice and clay-colored stools. On January 11, 1937, the patient became conscious of a large, painful tender mass, rapidly increasing in size, in the left upper quadrant of the abdomen. Associated with it was a septic type of temperature with profuse night sweats and remissions around 4 a. m., increasing pallor, weakness and episodes of epistaxis. The past history included occasional mild attacks of tonsillitis, but was otherwise negative.

Physical examination on admission revealed a very thin, markedly anemic, prostrated, white girl, with a pulse of 120, respirations 24 and temperature 102.6°F. The skin presented a waxy pallor and a lemon yellow tint. The scleras were jaundiced. All mucous membranes were extremely pale, no petechiae were noted. The anterior cervical lymph nodes were slightly enlarged. The heart was enlarged to the left, with the apex impulse visible and palpable 2 cm. to the left of the midclavicular line in the 5th intercostal interspace. The 1st sound was shortened. The rhythm was fetal in type. There was a soft, blowing systolic murmur heard over the entire precordium, with its point of maximum intensity to the left of the sternum in the 3rd intercostal interspace. The blood pressure was 120/70. A tender mass was palpable in the left upper quadrant of the abdomen, extending downward from beneath the subcostal margin to within 1 cm. of the umbilical level, and medially to about 2 cm. from the midline. The liver edge was felt 2 fingerbreadths below the right costal margin. It was soft, smooth and non tender. There was no ascites.

The blood (Table 1) showed a hemoglobin of 22 per cent, a red cell count of 1,160,000, a color index of 1.0 and a white-cell count of 7600. The differential count revealed 72 per cent polymorphonuclear neutrophils, 16 per cent being immature forms, 1 per cent eosinophils, 23 per cent lymphocytes, 3 per cent monocytes and 1 per cent Rieder cells. There were 140,000 platelets per cubic millimeter. Many microcytes and macrocytes were present in the stained smears. Marked anisocytosis and moderate poikilocytosis and polychromatophilia were noted. In the fragility test hemolysis began at 0.44 and was complete at 0.36. The icteric index was 32.6. A very faint van den Bergh reaction of the delayed direct type was found. Urinalysis revealed a dark, amber-colored urine of pH 5.8 and specific gravity 1.015. Albumin, sugar, acetone, diacetic acid and indican were absent, the sediment contained a very few hyaline casts, and a few squamous and cuboidal epithelial cells. None of several blood cultures yielded any growth at the end of 72 hours. The feces were negative for occult blood and for parasites or their ova. Blood Wassermann and Kahn tests were negative with cholesteriolized and alcoholic antigens. The sedimentation rate was 35 mm. in 15 minutes, and 42 mm. in 1 hour (cell volume, 15 per cent). Bone marrow blood taken on April 15, showed a differential count as noted in Table 1. Blood typing revealed a Group O response. It is significant that neither agglutination nor hemolysis appeared in cross-matching the patient's serum and the cells of ten donors from this group.

The patient ran a moderate temperature, varying from 99.6 to 104°F rectally throughout the first 63 days of her hospital stay. The spleen remained approximately the same size as on admission until it was removed on February 3 to relieve the symptoms of oozing gums and low platelet count. The spleen measured 20 by 11 by 10 cm. and weighed 900 gm. Five very large infarcts and a number of small ones were present. One of the large infarcts involved the entire depth of the spleen. The pathologist's (Dr W. E. Youland) report was, in part, as follows:

On microscopic section, the outstanding pathologic features are a primary hypertrophy and hypermitosis of fibroblasts, lymphoid cells, endothelial cells and myeloid cells, including a considerable admixture of eosinophilic myelocytes. There are also small and large mononuclear cells with deeply stained nuclei. Some of these mononuclear cells resembled the transitional cells of the blood; others resembled large plasma cells. A few are mononuclear with abundant eosinophilic granules in their cytoplasm. There are many mitotic figures among these cells.

Dameshek<sup>2</sup> considers these latter cells identical with the type he<sup>3</sup> has previously described as the erythrogon.

Cultures of the spleen, both aerobic and anaerobic, failed to show any growth during a 2 week period of observation. Wherever splenic material had touched blood agar slants and plates, hemolysis rapidly occurred. Such hemolytic activity was demonstrable against the patient's own cells and those of Groups O, A and B. No tests were made with specimens of blood from Group AB. A speci-

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Table 1 Blood Counts

DATE	HEMOGLOBIN Gm	COLOR INDEX	R B C COUNT × 10 <sup>6</sup>	W B C COUNT × 10 <sup>3</sup>	DIFFERENTIAL COUNT*				NOBIL BLASTS %	RETIC LOCYTES %	PLATE LETS × 10 <sup>3</sup>	OXIDIZ- ING CELLS %	REMARKS
					F M L % Total	LYM	MONO	MYEL					
1937													
Jan 16	22	1.0	1.16	7.6	56	16	72	1	23	3	140	28	Whole blood transfusion 500 cc
Jan 19	37	1.0	1.58	8.6	54	17	71	1	25	3			Whole blood transfusion 500 cc
Jan 21	30	1.0	1.44	7.2	52	20	72	2	23	3			Whole blood transfusion 500 cc
Jan 22	40	1.2	1.68	6.6	50	24	74	1	20	4	160		Whole blood transfusion 500 cc
Jan 26	22	1.5	0.93										Whole blood transfusion 500 cc
Jan 29	28	1.09	1.63										Whole blood transfusion 500 cc
Jan 30	35	0.9	1.34										Whole blood transfusion 500 cc
Feb 2	24	0.9	2.19	1.06	39	30	69	1	26	4	60		Feb 3—Whole blood transfusion 200 cc and splenectomy
Feb 4	42	0.9	1.86	6.2	59	21	80		40	0.4			Feb 5—Whole blood transfusion 325 cc
Feb 6	45	1.2	2.05	4.6	60	6	66		20	10			Whole blood transfusion 500 cc
Feb 9	43	1.0	2.00	14.6	63	12	75	1	7	10	165	71	Whole blood transfusion 500 cc
Feb 12	41	1.3	0.91	16.8	68	7	76		21	1			
Feb 15	24	1.2	0.93	19.4	57	10	67		4	1			
Feb 18	37	1.3	0.63	16.4	65	2	67		24	5			
Feb 27	14	1.2	1.35	10.1	55	5	55		3	7			
Mar 1	33	1.1	1.66	10.1	60	8	68		4	2			
Mar 5	34	1.0	1.66	9.13	32	6	38		5	5	85		
Mar 15	41	0.9	2.13	9.13	32	6	38		2	5			
Mar 30	56	0.8	3.30	11.5	20	5	25		3	3			
Apr 16	62	0.9	3.22	7.6	28	2	30		2	2			
June 4	56	0.7	3.76	6.1	51	10	61		9	1			
Aug 6	69	1.0	3.46	6.1	55	7	62		37	1			
Nov 23	71	0.9	3.72	9.3	55	3	58		2	2			

\* leukocytosis anisocytosis microcytosis macrocytosis and achromia were present in varying degrees in all counts until convalescence was well under way

men of sternal bone marrow showed an active erythroblastic and myeloblastic proliferation.

Among the complications observed during hospitalization were multiple infarctions of the spleen, a pneumonic process in the lung, probably secondary to pulmonary infarction, and cerebral disturbances resulting from the severe anemia. Symptomatic features of the clinical picture were weakness, which was often extreme, dyspnea, traceable at times to pain and at others to the severe anemia, persistent upper abdominal pain, shifting pains in various parts of the body, occasional vomiting, extreme pallor, jaundice and emaciation.

Abdominal pain was one of the most persistent symptoms. Before operation it was referred almost entirely to the left upper quadrant, where a dull, constant soreness and tenderness to palpation existed. Following removal of the spleen, the distress was most marked in the right upper quadrant. Severe exacerbations of sharp, stitching or knife like pains occurred almost daily. Prior to operation these pains were attributed to multiple splenic infarctions, with constantly increasing tension on the splenic capsule. Vomiting seemed to bear some relation to the episodes of acute exacerbation, the vomitus consisting of simple gastric contents in which free hydrochloric acid was found whenever a test was made. While there was a history of clay-colored stools prior to admission, all bowel movements during hospitalization were of a brownish or greenish brown color, except as influenced by the administration of iron.

After operation, improvement under liver concentrate, ferric ammonium citrate, high liver feeding and ingestion of 15 to 30 gm of bone marrow daily was very slow, and was punctuated both by gastrointestinal upsets and by symptoms referable to the severe anemia. On March 31, 1 week after being first allowed out of bed, the patient developed a very sudden deep jaundice with an icteric index of 1250. Hemoglobin was found in the urine at this time. Hemosiderin granules were not demonstrated. Blood plasma determinations of hemoglobin were not made. The blood cholesterol was 163 mg per cent and cholesterol esters 105 mg. Clinically this jaundice had practically disappeared by April 3—almost as rapidly as it had occurred. There was, however, still a large amount of bile and urobilinogen in the urine. From April 4 onward the patient ceased to complain of pains in the abdomen, her liver gradually decreased in size, although always remaining palpable, and she continued to improve in strength. Cholecystography on April 9 and again on October 19 revealed a ptosed, hypotonic gall bladder, showing no radiographic evidence of calculi.

Since the patient's discharge on April 16, 1937, her blood count has remained slightly below normal (Table 1). There have been repeated mild episodes of upper abdominal pain, associated with a low grade fever (0.5 to 1°F) and a slightly jaundiced appearance clinically on two occasions, although icteric indices have been within normal limits. Moreover, urine discoloration has been minimal, and not different in day and night specimens. The edge of the liver has receded beneath the costal margin. Subjectively she is asymptomatic.

Tests performed on November 27, 1937, and June 14 and November 12, 1938, were negative for the presence of autoagglutinins and autohemolysis. Observations were made at icebox (5°C), room and incubator (37°C) temperatures. Reactions with human blood cells of Groups O A and B were normal under similar conditions. The Donath-Landsteiner reaction was not done in the first series of tests and was negative in the second and third. On the last mentioned date, a check for the presence of autohemolysis of the type seen in paroxysmal hemo-

globinuria was made, according to the lactic-acid method described by Ham<sup>4</sup> and found positive by Dacie and associates<sup>5</sup> in their more recently reported case.

It is often difficult to classify cases of hemolytic anemia. Dameshek<sup>6</sup> believes that acute hemolytic anemia "may be related to paroxysmal (cold) hemoglobinuria, to paroxysmal nocturnal hemoglobinuria (Marchiafava), to acquired hemolytic icterus, to hemolytic splenomegaly (Banti) and even to congenital hemolytic jaundice." The present patient's course resembles that of acute hemolytic anemia of the Lederer type in the following regards: a family history negative for blood dyscrasias, a sudden onset, the rapid development of a severe anemia without demonstrable cause, evidence of hemolysis as shown by the skin coloration, a positive van den Bergh reaction and hemoglobinuria, demonstrated on one occasion, a macrocytic type of blood response with high reticulocytosis, and the presence of many normoblasts and a few megaloblasts in the circulating blood, and the further indication of very active erythropoiesis as shown by bone-marrow biopsy and study of bone-marrow blood.

Dameshek<sup>6</sup> has been able to demonstrate a hitherto undescribed hemolysin in the serum of patients with acute hemolytic anemia in half to one third of the tests. This is active against cells of the same blood group to which the patient belongs, and against cells of Group O for which, theoretically at least, isohemolysins should not exist. The serum of the case under discussion failed to hemolyze cells from any of ten transfusion donors who belonged to her group (Group O). One would have expected to observe such incompatibility in at least two of the tests made if the case conformed to the type described by Dameshek.

The condition differed from the usual course of Lederer's anemia as follows: the failure of the patient to respond to repeated transfusions, the presence of leukopenia and of thrombocytopenia, the repeated return of episodes of jaundice following splenectomy, and the continuation of mild

anemia and low-grade fever for more than one year following the acute attack. These latter features clinically suggest the type of chronic hemolytic anemia with paroxysmal nocturnal hemoglobinuria described recently by Ham,<sup>4</sup> in which the hemolytic factor is apparently inherent in the red cell and can be activated by altering the hydrogen ion concentration of the blood toward the acid side. Such a "lysin" could not be demonstrated in the present case. Unfortunately Ham does not mention the subsequent course of any of his 3 cases. The patient in the case here reported now seems healthy in every particular save for a very slight anemia and the occasional presence of fever (never exceeding 15°F). As originally described by Marchiafava,<sup>7</sup> splenomegaly is not a feature of paroxysmal nocturnal hemoglobinuria. Ham found it in all his cases. Splenomegaly was marked in the present case, and the spleen on microscopic examination showed active reticuloendothelial proliferation with slight erythrophagocytosis.

#### SUMMARY

A case of hemolytic anemia is reported, which in its onset and early behavior simulated that described by Lederer and in its later course suggested Marchiafava's disease, but which has throughout failed to satisfy all the usual criteria for either

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## DISEASE OF BESNIER-BOECK-SCHAUMANN

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IT IS always easy to give a new name to a disease. This can even become an inveterate habit, particularly among dermatologists. It seems, however, that the name of "disease of Besnier-Boeck-Schaumann," recently proposed by Pautrier, of Strasbourg, is well justified to designate a benign and chronic disease, perhaps tuberculous, which reveals itself in cutaneous, ocular, respiratory, lymphatic and osseous manifestations. Of these, the cutaneous ones are the most important, and comprise a considerable part of the sarcoid group.

The purpose of this article is principally to present the point of view of the Strasbourg school concerning a supposedly autonomous affection, without any implication that this conception is entirely original. I am aware that the subject has been given serious treatment in every country. But it is Pautrier who has given the subject its greatest recent stimulus, his point of view remains the most comprehensive of all, and deserves close consideration.

## HISTORY

This new conception was determined by dermatologists, because the cutaneous manifestations of the disease were for a long time the only ones known. According to Pautrier,<sup>8</sup> its genesis was developed in three periods.

In 1889 Besnier described under the name of lupus pernio a kind of chronic chilblain of the face and hands. This disease remained an enigma for a long time. Before Besnier, however, as Hunter<sup>4</sup> says, Hutchinson had already described the "chilblain lupus," but according to Darier<sup>2</sup> this atrophic disease is more nearly related to lupus erythematosus than it is to lupus pernio.

About 1900 Boeck described, first under the name of multiple, benign, dermic sarcoids, then that of miliary lupoids, some lesions which were usually nodular and never ulcerated. This group of sarcoids, today separated, was associated with the tuberculids of Darier.

Lupus pernio and Boeck's sarcoids remained isolated types of lesions until 1916, when Schaumann<sup>12</sup> claimed they were manifestations of the same disease, which he called benign lymphogranulomatosis.

To these three periods we can add a fourth, because since 1935 Pautrier<sup>9-11</sup> has enlarged the noso-

logical picture of Schaumann, and has identified it with an affection of the reticuloendothelial system.

This résumé represents half a century of controversy over the debatable question of tuberculids and the erroneously termed sarcoids.

## PATHOLOGY

*Cutaneous lesions* The disease reveals itself almost always by its cutaneous manifestations, the others being discovered by routine examination. There are two types of cutaneous lesions. The first consists of nodosities the size of a cherry stone, causing small, infiltrated, yellow-red or violaceous elevations, they usually number two or three, but there are sometimes several dozen. These are the so-called large, nodular Boeck's sarcoids. The second type consists of lesions in the form of patches, blue-red, smooth, infiltrated and sometimes a little soft. They may be scattered over the skin in which case they are called Boeck's diffuse, infiltrating sarcoids. A patch is often located on the nose, and is then called lupus pernio. Sometimes one is located on a finger, possibly resulting in a fusiform deformation resembling that caused by spina ventosa.

No matter of what size, these lesions under glass pressure present translucent, miliary grains resembling those of lupus vulgaris, hence the term miliary lupoids, also given them. They persist for several months or years without ulceration, sometimes they are reabsorbed spontaneously. They are never painful, nor do they itch.

*Ocular lesions* These are next in frequency to the cutaneous lesions. They consist of obstinate conjunctivitis, and sometimes of tenacious iritis. Recently Pautrier<sup>11, 13</sup> connected with the disease of Besnier-Boeck-Schaumann an affection known to ophthalmologists as the syndrome of Heerfordt (of Copenhagen), which had until then remained an enigma. This syndrome consists of iridochoroiditis associated with bilateral parotitis, peripheral facial paralysis, recurrent paralysis and often cutaneous manifestations. Lastly, some cases of granular conjunctivitis of Parinaud are undoubtedly associated with the disease of Besnier-Boeck-Schaumann.<sup>5</sup>

*Lymphatic lesions* These always evolve unnoticed, and must be searched out systematically.

The tonsils may be enlarged, but their lesions are shown only by histological examination. In the groin, axilla, neck and epitrochlear regions the nodes may become enlarged to the size of a hazel nut. They remain painless and do not adhere to the subjacent tissues. One lymphatic ganglion is always attacked, namely the tracheobronchial group. One must not expect to find in such a case the picture of massive tracheobronchial adenopathy, its existence is revealed only by routine x-ray examination. In some cases, however, the ganglionic reaction is serious, the lesion invading the mediastinum and giving the appearance of Hodgkin's disease.

*Respiratory lesions* The attack on the lungs may be pronounced, it evolves without symptoms and without changes demonstrable by percussion and auscultation. One finds by x-ray examination a multitude of miliary spots, scattered in both lungs, principally in the upper two thirds. These granulations are dense and have fuzzy contours, they may become confluent and be connected by a network of tissue of increased density. They may be so numerous as to give a diffused opacity when examined by radiology. One must again point out that these lesions develop without fever and unnoticed. They are, says Pautrier,<sup>10</sup> a radiological surprise, exactly like those of the "cold, diffuse, miliary tuberculosis" recently described by Swiss authors, moreover, they offer some astonishing analogies with them.

The mucous membrane of the nose may be invaded by small granulations, white or pink, slightly soft and the size of a pinhead.

*Osseous lesions* Often one finds curious alterations of the bones, principally those of the fingers. The lesions develop unnoticed and are radiological discoveries. They consist in areas of rarefaction, which lead to the formation of well-circumscribed cystic cavities. They may persist for several years. Schaumann<sup>12</sup> considers them a major sign of his lymphogranulomatosis.

*Other visceral lesions* The lesions of this disease may occur in the spleen, liver or kidneys, but never produce symptoms. They can be recognized only by histological examination in case of death from some other cause, this affection never being fatal.

*Alterations of the blood* Though Schaumann attaches extreme importance to changes in the blood, they are infrequent and merely consist of an increase in monocytes.

*Miscellaneous lesions* The picture of the disease of Besnier-Boeck-Schaumann is not limited, however, by the above lesions. One hears of certain cases of diabetes insipidus which may be caused by this affection.<sup>6</sup> One may expect to find

a broadening of its field in other cutaneous manifestations, as, for instance, unexplained and atypical erythrodermic or keratodermic patches. It would not surprise me to find, before long, associated with this disease certain forms of acne or sclerodactylia (which I have seen coexisting with lupus pernio) or of lichen—particularly lichen nitidus, so rich in epithelioid cells, which, as we shall see, are a distinguishing characteristic of the disease of Besnier-Boeck-Schaumann.

#### DIAGNOSIS

This affection is frequent in northern countries. It is usually hopelessly chronic, undergoing recrudescence in winter. Sometimes patients improve spontaneously. The condition is compatible with a fair state of general health.

The diagnosis is not always simple. One must remember it when confronted by papulous or nodular, acneiform and chronic cutaneous lesions, by chronic chilblains, by unimproved adenopathy or by tenacious ocular lesions. In certain cases the research must be extended in order to eliminate true tuberculides, true but persistent chilblains, spina ventosa, "cold, diffuse miliary tuberculosis" or even Hodgkin's disease.

X-ray examination is essential to diagnosis, and a blood count is occasionally found useful. Schaumann<sup>1</sup> attaches decided importance to the cutaneous reaction to tuberculin, which must here be negative. But there is no rule without an exception, especially in this reaction. Moreover, guinea pigs inoculated with fragments of all forms of tissue or with blood never develop tuberculosis, a fact of the utmost scientific interest.

#### HISTOLOGY

It is the histological examination that definitely determines the diagnosis of this disease. No matter where the condition manifests itself, whether in the skin, lymph nodes, tonsils, parotid glands, lungs or bones, it invariably produces an identical type of lesion: infiltration consisting of nodules of epithelioid cells. The nodules are surrounded by scattered lymphocytes, but there are never dense zones of lymphocytic infiltration. Giant cells are exceptional. Foci of necrosis are never found. Around the nodules no reaction of the collagenous tissue exists: the masses of epithelioid cells are set in the surrounding tissue like foreign bodies which are well tolerated. Thus the lesions lack a true tuberculous structure, although they might be considered as imperfectly developed tuberculous follicles with a very light peripheral inflammatory reaction. In some cases, however, the presence of numerous giant cells seems to indicate the existence of a transitory form between the disease of

Besnier-Boeck-Schaumann and tuberculosis<sup>7</sup> On the other hand, in very rare cases there are wandering cells of different types, which may prove the possibility of an evolution toward granulomatosis

#### ETIOLOGY

Should we consider the disease of Besnier-Boeck-Schaumann a tuberculide, that is an attenuated form of tuberculosis, due either to a degenerated bacillus, a tuberculous toxin or a filterable virus? Or should we, with Schaumann, invoke an inactive tuberculosis of bovine origin? Both these hypotheses, according to Danish authors,<sup>1</sup> appear improbable because of the frequent negativity of the tuberculin reaction and the constant negativity of the inoculation of guinea pigs. These authors and Pautrier<sup>3</sup> believe the condition to be an autonomous infectious granulomatosis, due to a new virus which may be placed between those of tuberculosis and leprosy.

As for the cases complicated by tuberculosis, this does not prove, as some authors contend, the tuberculous nature of this disease, as Pautrier<sup>13</sup> says, tuberculosis develops in such cases on a ground already weakened by another infection. Moreover, it is well known that the disease occurs frequently in northern countries where tuberculosis is especially rare.

May not the disease of Besnier-Boeck-Schaumann be a syndrome determined by several causes, as Darier<sup>2</sup> admitted in the case of all cutaneous sarcoids? As to this, let us recall that the epithelioid-cell reaction is not a specific response to the presence of the tubercle bacillus, but may be produced by materials derived from other organisms (Jordon and Osborne<sup>3</sup>).

#### TREATMENT

It is difficult to formulate a treatment for a disease the cause of which is uncertain, and which presents spontaneous improvement. The usual treatment is the same as that for tuberculides, that is, organic arsenic and intradermal injections

of tuberculin, this treatment was the only effective one in two cases reported by Lesné<sup>13</sup>. Lomholt,<sup>1</sup> true to the Danish etiologic conception, prefers preparations derived from chaulmoogra.

#### SUMMARY

The disease of Besnier-Boeck-Schaumann, extremely variable in its clinical forms and in its evolutionary methods, usually manifests itself by persistent but not pronounced manifestations, reaching the eyes, the respiratory apparatus, the skeleton, the lymphoid organs, several glands such as the parotids, and the spleen, liver and kidneys. But the skin is above all its favorite site, there it reveals itself by several lesions which belong to the group of sarcoids. No matter where the disease shows itself, the lesion is invariably identical, with epithelioid cells. By some of its aspects it allies itself with attenuated tuberculosis, but its nature is not yet absolutely determined. It may be an autonomous affection, or perhaps merely a syndrome caused by one of several factors.

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## PAPERS FROM THE FAULKNER HOSPITAL

## POPLITEAL ANEURYSM

## Report of Two Cases

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THE popliteal artery, with the exception of the aorta, is the most frequent site of the formation of an aneurysm. This fact is not generally recognized, nor is the fact that popliteal aneurysms are by far the most frequent of the operable types. Matas<sup>1</sup> reported a series of 106 operable aneurysms covering all the important regions of the body, it was found that 62 (58 per cent) involved the popliteal artery. In the same series, 63 (66 per cent) of 95 aneurysms involving the arteries of the lower extremities, including the iliac vessels, were popliteal. Matas quoted Delbet as finding that aneurysms of the popliteal artery constitute over one third of all the peripheral and surgical aneurysms.

Popliteal aneurysms differ from those involving other arteries in that they generally tend to progress more rapidly and that the incidence of severe and unheralded complications is high. Spontaneous gangrene frequently occurs following thrombosis. Furthermore, as the aneurysm expands there is gradual stretching and absorption of the surrounding ligaments, the pulsating tumor may erode the adjacent bone, in time there may be rupture into the soft tissues or the knee joint. The latter complication is a constant and serious menace in any case of the disease.<sup>2</sup>

The anatomical location of the popliteal artery favors the development of complications, since the vessel courses through a small, tightly bound space replete with important structures.

Matas classifies aneurysms of the popliteal artery in three categories, according to their anatomical location: upper, middle and lower. The upper, or femoropopliteal ones, have room for expansion and, what is more important, involve a relatively small number of collaterals. Those of the lower or popliteocrural group are forced to develop in a small space, which also includes the popliteal vein and the peroneal and popliteal nerves. The danger of gangrene is more imminent in the latter group, since it is easy for a plug of thrombus to lodge at the popliteal bifurcation or in one of the main collaterals in that region. If this occurs, the only avenue for the collateral circulation of the leg is through the smaller arteries arising from the popliteal artery in the region of the knee joint. Likewise, pressure on the

vein may result in gangrene, and involvement of the nerves may cause trophic disturbances.

There are several important etiologic factors in the production of popliteal aneurysms, probably the most important of which is trauma, although they are rarely of purely traumatic origin. In the majority of cases the patient cannot recall any single outstanding trauma to the popliteal region. Delbet, again quoted by Matas,<sup>1</sup> believes that the internal and middle tunics of the artery are ruptured during violent lifting efforts in which the intra-arterial pressure is elevated. This rupture may be so insignificant as to cause no appreciable symptoms at the outset, or may be severe enough to cause immediate thrombosis in the vessel, with subsequent symptoms of arterial gangrene. Arteriovenous and false aneurysms may also result from trauma. Arteriosclerosis is a predisposing factor in the production of the aneurysmal sac. Syphilis usually causes aneurysms in the larger arteries of the body, but occasionally one finds that a popliteal aneurysm is syphilitic in origin. A rare cause is lodgment of septic emboli on the intima, mycotic aneurysms develop in this manner. Wells and his associates<sup>3</sup> have failed to find a case of congenital aneurysm of the popliteal artery, and they also doubt whether a dissecting aneurysm could occur there, since the coats of the arterial wall are thin and indistinct.

Diagnosis is easy in the advanced case, which presents the typical picture of a pulsating tumor transmitting a loud bruit and thrill. The same clinical signs, however, may be found in vascular tumors, and arteriography is employed to differentiate the two conditions. This is also used to determine the character and location of the disease process and the presence and adequacy of collateral circulation. The use of Thorotrast has been virtually abandoned, since it has been shown that particles of radio-active thorium dioxide are stored in the reticuloendothelial system of the spleen and liver after intravenous administration. Because of this property the drug has not been accepted by the Council on Pharmacy and Chemistry<sup>3</sup> of the American Medical Association. In 1937, an editorial<sup>4</sup> in the *Journal of the American Medical Association* re-emphasized the hazard. While as many as ten or fifteen years may elapse between the administration of Thorotrast and the resultant tissue changes, the length of this period

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is no indication of ultimate safety. The editorial goes on to say "Recent reports emphasize the proclivity of this substance to produce necrosis and malignant change in tissues with which it remains in contact." Diodrast and similar iodine preparations used for excretory urography are excreted rapidly, and are relatively non-toxic in the doses used. They have an advantage over sodium iodide in that they cause no damage to the intima of the vessels and no pain on intravascular injection. The density of the shadow cast is entirely satisfactory, although not so clear cut as that of Thorotrast.<sup>6</sup>

Yater's<sup>8</sup> technic of administration follows. While an assistant compresses the femoral artery as it emerges under the inguinal ligament, 20 or 25 cc of Thorotrast is injected into the artery in Scarpa's triangle. An x-ray is taken immediately, five or six pulsations are then permitted to pass along the vessel, and another x-ray is taken. In the two cases reported below, Diodrast was injected directly into the aneurysm, a tourniquet being applied on the thigh and lower leg in order to prevent too rapid escape of the contrast medium. The x-ray films obtained in this manner are entirely satisfactory, and the procedure is easily carried out.

Thies<sup>7</sup> stresses early diagnosis, stating "Aneurysms of the popliteal artery produce disturbances in the peripheral circulation even before the onset of local symptoms in the popliteal space. With the arterial pressure at least partially expended in dilating the aneurysmal sac, a corresponding reduction in pressure occurs in the distal circulation. Accordingly, the peripheral arterial pulsations and temperature readings are reduced." He recommends that all cases of peripheral circulatory disturbance be studied by temperature readings and by oscillograph and differential tests for organic and spastic vascular diseases.

The treatment of popliteal aneurysms consists of promoting collateral circulation and evaluating its efficiency, then surgical exploration, adapting the type of procedure followed to the type of aneurysm found, and finally further development of the collateral circulation postoperatively.

The measures most commonly used to promote collateral circulation are temporary occlusion of the artery above the aneurysm, sympathectomy and passive vascular exercise. Matas<sup>8</sup> stresses the following methods of testing the efficiency of the circulation: (1) the hyperemic reaction or modified Moszkowicz color test, (2) oscillometric manometry to determine peripheral blood pressure after temporary occlusion of the main artery, and (3) the clinical demonstration of a persistent cir-

ulation and nutrition of the peripheral parts in spite of permanent absence of the peripheral pulses.

Of the surgical procedures employed, those of Matas<sup>1</sup> are most generally applicable. He describes three types of operation. The first is obliterative endoaneurysmorrhaphy (the fundamental procedure), consisting of opening the sac and closing all visible orifices in it with fine chromic catgut or silk sutures, following which the sac is obliterated in one of several ways. Thus the artery is completely occluded. The procedure is applicable particularly to fusiform aneurysms in which the aneurysmal sac consists of a dilatation of the artery. The method is also used in cases in which the aneurysmal wall is friable and does not lend itself to reconstructive procedures.

Restorative aneurysmorrhaphy is used in sacular aneurysms where the greater portion of the arterial wall is normal, and the aneurysm forms a pouch protruding from it. The sac is opened and the single orifice is closed with a continued suture, thus preventing the flow of blood into the sac but leaving the lumen of the main artery patent. Obliteration of the sac is carried out by approximation of the endothelial surfaces.

Reconstructive aneurysmorrhaphy is applicable to fusiform aneurysms in which the sac walls are favorable to reconstructive surgery. The two openings must lie on the same level, in close proximity. The continuity of the artery is restored by forming a new arterial wall from the sac, suturing the wall about a guide previously introduced into the artery. Since one is dealing with a diseased vessel wall there is a marked tendency toward recurrence. It is rarely possible to perform this operation successfully, and further surgery is usually required.

Unless the picture presented is one of ruptured aneurysm, one should await development of adequate collateral circulation before operation is undertaken.

#### CASE REPORTS

*Case 1* F B, a 27-year-old store manager, entered the Faulkner Hospital complaining of a swelling in the back of the right knee which had been present for 6 weeks. Previously he had been in good health. The swelling caused him no great inconvenience until 2 weeks before entry, when it suddenly started to increase in size. After this, pain began and gradually progressed to a severe, steady ache which required medication for relief at the time of admission. There was no history of recent injury.

The past history was noncontributory except for scarlet fever during childhood and an injury to the right knee by a fall 9 years before entry. At that time the patient sustained a laceration requiring four sutures. His past history was otherwise essentially negative, and the family history was irrelevant.

Physical examination revealed a well-developed, well-nourished man. The temperature was 100°F and the

blood pressure 140/70. The heart sounds were regular and of good quality, and there were no murmurs. The abdomen and genitalia were negative. There was an old scar on the anterior surface of the right knee. In the right popliteal region there was a diffuse, markedly tender swelling about the size of an orange. This was pulsating and a thrill was felt. On auscultation a distinct bruit was heard.

The urine was normal. The white-cell count was 10,200 and the differential count was normal. The red cells were normal, as were the hemoglobin and platelets. A blood Hinton test was negative.

X-ray films of the right knee showed no bone or joint changes. There was a soft tissue tumor in the popliteal area about 5 cm. in diameter, consistent with a diagnosis of popliteal aneurysm. On the day following entry, films were taken after injection of the tumor mass with Diodrast solution (Fig 1). There was partial filling of a cavity



Figure 1 Case 1

*Ruptured aneurysm of the popliteal artery demonstrated by the injection of Diodrast directly into the sac*

measuring 9 cm. in diameter. The posterior wall showed a rather laminated structure. There was a small amount of extravasation posteriorly into the subcutaneous tissue and partial filling of a cylindrical structure 4 cm. long which was apparently the popliteal artery. The diagnosis was large popliteal aneurysm on the right, containing a large clot partially organized.

During the first 3 days in the hospital the patient had terrific pain, with a rapid increase of swelling of the right knee and lower leg. The temperature rose daily to 101°F, the pulse rate varied between 94 and 120, and the respirations were 20. Because of the intense pain and increase in swelling, operation was performed 3 days after admission, without further study.

Under spinal anesthesia, an incision 20 cm. long was made over the popliteal space. Dissection was carried down to the popliteal vessels, and a large ruptured aneurysm was found. Clot and connective tissue filled the whole popliteal space, and there was considerable edema. Proximal and distal openings into the sac were found and sutured in two layers, following which the entire sac was imbricated. On removal of the tourniquet there was a little bleeding and pulsation of the small vessels below the sac, indicative of some collateral circulation.

Postoperatively the leg was kept in the prone position with a heated cradle over it. During the first few days

two small decubitus ulcers appeared over the external malleolus and the patient had anesthesia of the sole and toes and lateral aspect of the leg to the mid-calf. During the first 6 postoperative days the temperature ranged from 98.6 to 102°F, and the pulse from 90 to 120. Collateral circulation improved gradually so that by the 7th postoperative day there seemed little question that the circulation would be adequate. The skin anesthesia remained as described, but the patient became able to move his toes and foot. On the 10th postoperative day Buerger's exercises with slight massage were started. The following day the upper and lower poles of the incision began to discharge large amounts of thick, foul pus from which *Streptococcus hemolyticus* was cultured.\* Hot flaxseed poultices were applied and exercises and massage were continued. The patient was allowed up in a wheel-chair on the 16th postoperative day, but there was still some purulent drainage from the wound. The skin anesthesia was considerably less than before and there was good movement of the toes and foot. Four days later, when the patient was on crutches for the first time, the leg became extremely cyanotic, but this disappeared completely when he returned to bed. Vasculator treatment was begun for 20 minutes twice daily on the 21st postoperative day and was continued for 4 days, at the end of which time he was discharged.

Seventeen months after operation the patient still walked with a slight limp and there was considerable atrophy of the leg. It was, however, a well functioning limb.

**Case 2** J. McC., a 34-year-old dentist, entered the Faulkner Hospital complaining of a swelling in the back of the left knee. The swelling was first noticed about 2 weeks prior to entry, and there was no known trauma preceding its appearance. During the 2 days before admission it had become painful, but otherwise it had not inconvenienced the patient in any way. The past history was noncontributory except for the usual childhood diseases and scarlet fever. There was a knee injury sustained in playing football 19 years before entry, but the patient did not remember whether this involved the left or the right knee. The rest of the past history and the family history were irrelevant.

Physical examination revealed a well-developed man in excellent general condition. The heart, lungs and abdomen were normal. The left leg was considerably larger than the right. The superficial veins were moderately distended, and in the left popliteal space there was a round, smooth, slightly tender mass, which pulsated visibly. A definite bruit was audible. There was no clinical evidence of syphilis, and blood Wassermann and Hinton tests were negative.

Urinalysis revealed no abnormalities. The white-cell count was 13,450, and the differential count was normal. The red-cell count and hemoglobin were normal.

On the day of admission a flat film of the knee showed no bone or joint changes and no soft tissue masses. Injection of Diodrast directly into the mass demonstrated a sac measuring 5.5 cm. in diameter and communicating with the arterial system (Fig 2). There was a small amount of Diodrast in the lower portion of the femoral artery, and the sac was located in the popliteal space. The large branches of the popliteal artery were well outlined. Following the injection of the Diodrast there was no visible pulsation, tactile pulsation or bruit, a collateral vessel gave a flush to the mid-calf. This seemed best ex-

\*These cultures, the short duration of the lesion and the fever all suggest the possibility of a mycotic aneurysm but there is no definite proof that infection was the primary etiologic factor.

plained by clotting in the sac following the insertion of the needle.

Operation was performed on the 9th day. A tourniquet was adjusted on the thigh, and a longitudinal incision was made over the popliteal space. The popliteal artery was exposed above and below the aneurysm. On being opened the sac was found to contain recent but fairly well-organized clot. The aneurysm was saccular in type and there were three openings into it. These were su-

Postoperatively the leg was kept in a prone position. The color of the extremity remained good, leg and foot motions were normal, and there were no areas of anesthesia or paresthesia. Bicycle exercises were begun, with no untoward effect. The patient got out of bed on the 12th postoperative day and was discharged home 4 days later.

Twenty-two months after operation the patient was entirely free from symptoms referable to the aneurysm or to the operation.

#### SUMMARY

Of the peripheral arteries, the popliteal is the commonest site of aneurysm formation.

Owing to the anatomic relations of the popliteal artery, complications are of frequent occurrence in aneurysms arising from this vessel. The frequency and severity of these complications vary with the segment of the artery involved.

Trauma and arteriosclerosis are the most important predisposing factors to the development of popliteal aneurysms.

The use of Thorotrast in arteriography may be dangerous and should be abandoned in favor of Diodrast.

The treatment of popliteal aneurysms is discussed, and two cases are reported.

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Figure 2 Case 2

*Demonstration of an aneurysm of the popliteal artery and the peripheral portion of the vessel with its branches by the injection of Diodrast directly into the sac*

tured with mattress sutures of chromic catgut in two rows and the entire sac was imbricated in three layers. There was arterial bleeding of the minor vessels in the fascia and fat, and a definite hyperemia below the site of the aneurysm.

## CASE RECORDS OF THE FAULKNER HOSPITAL

Antemortem and Postmortem Records as Used in Monthly  
Clinicopathological Conferences*Directed by J BEACH HAZARD, MD*

## CASE 6382

## PRESENTATION OF CASE

*First Admission* A seventy-two-year-old, American business man was admitted with the complaints of fatigue and general weakness.

About nine months preceding admission, he noticed that he became short of breath readily. Soon after this he developed a sore throat, which was associated with a fever and with a cough. After four weeks these symptoms disappeared, and the patient was fairly well except for a feeling of fatigue. One month before entry, marked dyspnea developed and was accompanied by palpitation. He also noticed that he was becoming pale. During a period of two weeks at this time his hemoglobin was said to have dropped from 77 to 35 per cent. In two months there had been a weight loss of about 15 pounds. A blood examination done about a week before admission showed a red-cell count of 1,300,000 with a hemoglobin of 25 per cent (Sahli), and a white cell count of 1300 with 24 per cent polymorphonuclears, 64 per cent lymphocytes, 8 per cent monocytes, 1 per cent eosinophils and 1 per cent basophils. The mean corpuscular volume was 99 cu  $\mu$ . The red cells showed macrocytosis and no achromia, platelets were rare in smears. A platelet count was 23,000, 25 per cent reticulocytes were present. Treatment preceding entry consisted of intramuscular liver extract, Ferrosate, hydrochloric acid and a diet which included liver, oysters, tripe and clams. In spite of therapeutic procedures, however, the patient's course was steadily downhill.

A past history revealed that the patient had had incipient tuberculosis forty years before admission. He had had measles, mumps, pertussis and scarlet fever. Two years preceding entry he had been in an automobile accident, with a resulting hematoma of the right leg. The family history was irrelevant.

Physical examination revealed a well-developed and well-nourished, very pale man lying comfortably in bed. No icterus was present. The pupils reacted to light and accommodation. No hemorrhages were present in the retinas. All teeth were absent. The throat was negative. No lymph nodes were palpable. The heart sounds were of good quality, with no murmurs, and the rate regular and rapid. The lungs were clear throughout. Examination of the abdomen showed no enlargement of the spleen. One observer noted

that the liver edge was two fingerbreadths below the right costal margin and presented a questionable irregularity of the edge. Bilateral inguinal hernias were present. The genitalia were negative. Rectal examination revealed a prostate of average consistence but with slight enlargement of the right lateral lobe. The knee jerks were equal but active. The temperature on admission was 99°F, the pulse rate 112, and the respirations 24. The blood pressure was 140 systolic, 58 diastolic.

Urinalysis showed a clear straw-colored specimen with acid reaction and a specific gravity of 1.015 and with no albumin, sugar, bile, diacetic acid or acetone. The sediment showed 1 to 3 white blood cells per high-power field but was otherwise not remarkable. A urobilinogen test was positive through a dilution of 1:8. The white-cell count was 2000, and the red-cell count 1,300,000 with a hemoglobin of 35 per cent (Sahli). A differential count showed 41 per cent polymorphonuclears, 1 per cent monocytes, 55 per cent large lymphocytes and 3 per cent small lymphocytes. There were frequent macrocytes, moderate anisocytosis, slight poikilocytosis and no achromia. Platelets appeared markedly reduced. A rare nucleated red cell was seen. The bleeding time was 6 minutes, and the coagulation time 15 minutes (Lee and White) with no retraction of the clot in twenty-four hours. A blood Hinton test was doubtful. A stool examination was negative.

X-ray films of the dorsal and lumbar regions of the spine, pelvis and upper femurs showed no definite destructive changes. The texture throughout the symphysis, including the rami, was definitely coarse as compared to the normal. The lumbar vertebrae appeared normal. The upper dorsal vertebrae were rather granular but showed no definite areas of destruction. X-ray films of the chest showed a striated density extending from the hilums to both apices. The lung markings were prominent throughout the remainder of both lung fields. The hilar areas were increased in density. There was slight retraction of the apical pleura on the right.

During two weeks' stay in the hospital the patient was placed on an anemia diet and was given four transfusions of 500 to 650 cc of whole blood each. A bone-marrow biopsy was performed four days following admission. Successive red-cell counts

were 1,600,000 with a hemoglobin of 41 per cent, 1,900,000 with a hemoglobin of 57 per cent and, on the date of discharge, 3,200,000 with a hemoglobin of 66 per cent. A white-cell count two days after admission was 1050 with 42 per cent polymorphonuclears and 58 per cent lymphocytes. Smears showed moderate anisocytosis, slight polychromasia and apparently decreased platelets. The white-cell count five days before discharge was 2000. The temperature varied irregularly up to 102°F throughout his stay.

*Second Admission* (three months later). Following discharge the patient showed steady improvement. Treatment consisted of a high-vitamin diet and, at first, intramuscular liver extract, then liver by mouth. About four weeks preceding his second admission he noted a swelling of the right testicle, which appeared suddenly and then increased gradually in size.

Physical examination showed a well-developed and well-nourished man with good color. Except for an enlarged scrotum and bilateral inguinal hernias, examination was essentially negative. Local examination of the scrotum showed a slightly tender mass on the right that seemed to involve the whole testicle. The temperature was 97.4°F, the pulse rate 110, the respirations 20 and the blood pressure 150 systolic, 88 diastolic. The white-cell count was 6800, and the red-cell count 4,100,000 with a hemoglobin of 88 per cent. A differential count showed 60 per cent polymorphonuclears, 36 per cent lymphocytes and 4 per cent monocytes. The red blood cells and platelets appeared normal. A urinalysis showed no albumin or sugar. A blood Hinton test was negative.

Two days after admission an orchidectomy was performed. The postoperative course was uneventful.

#### DIFFERENTIAL DIAGNOSIS

DR MAURICE B. STRAUSS. This patient had a profound disturbance involving all the formed elements of the bone marrow,—erythrocytes, leukocytes and platelets,—in other words a panmyelophthisis. Such a condition cannot result from either blood loss or increased blood destruction. The severity of the leukopenia is against pernicious anemia, although I have rarely seen cases with the granulocytes and platelets as low as this. However, since the patient apparently received an adequate amount of liver extract intramuscularly and failed to respond, pernicious anemia may be excluded, although in favor of such a diagnosis is the remission lasting for at least three months while the patient received further liver therapy.

If we may exclude pernicious anemia, what then

may give this type of blood picture? There is no history of exposure to benzol, arsphenamine, gold salts or other drugs, of external irradiation from x-rays or radium or of the ingestion of radioactive substances. There is nothing to suggest chronic nitrogen retention, and further, nucleated red blood cells are not found in anemia from this cause. Chronic infections may produce this picture. However, there is insufficient evidence here for a chronic infection of sufficient severity to do this. Fever up to 102°F is not unusual with severe anemia.

We are therefore left with two main causes of myelophthisis infiltrative (idiopathic) aplasia and pseudo-aplasia of the bone marrow. We can exclude metastatic carcinoma, hypernephroma, myeloma, plasmoma, aleukemic myelosis, Hodgkin's disease, tuberculosis of the bone marrow and osteosclerosis because spontaneous remission of anemia does not occur in these conditions. However, the nucleated red blood cells are strongly suggestive of such an infiltrative lesion. These cells also are evidence against an aleukemic lymphatic leukemia.

Aplasia and pseudo-aplasia of the marrow can give exactly this blood picture except for the nucleated red blood cells. Remissions, although rare, do occur. Diagnosis, however, can only be made positively by bone-marrow biopsy, remembering that at least half the cases of so-called aplastic anemia show a hyperplastic marrow.

The changes in the bones evidenced by x-ray examination suggest Paget's disease. The prostate should not show carcinoma. The tender testicular swelling is probably inflammatory, possibly tuberculous, although tuberculosis is almost always limited at first to the epididymis.

In conclusion, then, the picture presented here is most consistent with a spontaneous remission of a primary bone-marrow disturbance either of an infiltrative aplastic or of a pseudo-aplastic type.

#### CLINICAL DIAGNOSES

Aplastic anemia  
Bilateral apical tuberculosis, fibroid type  
Tuberculous epididymitis

#### DR. STRAUSS'S DIAGNOSES

Anemia of infiltrative aplastic or pseudo-aplastic type  
Tuberculous epididymitis (?)

#### ANATOMICAL DIAGNOSES

(Pancytopenia)  
Miliary tuberculosis of bone marrow  
Tuberculous epididymitis  
Hydrocele

## PATHOLOGICAL DISCUSSION

DR J BEACH HAZARD Dr Strauss has summarized the case well. The bone-marrow biopsy was interesting in two respects. In spite of the severe anemia the marrow showed an increased cellularity with moderate hyperplasia of the red-cell series. That is not the classical picture one associates with aplastic anemia, of course, but it is well recognized that a fair percentage of such cases will show a cellular marrow. An additional finding was the presence of tubercles, but to date no acid-fast bacilli have been demonstrated in them. The specimen from the operation was composed in part of a hydrocele which, when opened, revealed an enlarged epididymis. The latter presented numerous yellow, often semi-fluid areas, in smears of which many acid-fast bacilli were found. Histologically there was a typical tuberculous epididymitis.

The appearance of the marrow lesions and the finding subsequently of tuberculosis elsewhere has led us to make a diagnosis of miliary tuberculosis of the bone marrow. The blood picture was generally consistent with aplastic anemia. Unfortunately the bone-marrow biopsy did not show the acellularity of typical aplastic anemia, but as stated, a certain number of cases may show hyperplasia. The question of the relation between the tubercles and the anemia arises. Cases of miliary tuberculosis do develop severe anemia, but to my knowledge, remissions do not occur. One is still tempted, however, to believe a relation exists in this case, and perhaps the future course of the patient may prove it.

DR EDWARD L YOUNG, JR Was the testicle involved?

DR HAZARD No.

DR STRAUSS Miliary tuberculosis of the bone marrow is a relatively rare condition which is generally associated with disseminated miliary tuberculosis and is usually fatal.

Most of the cases of clinical, aplastic anemia which we have seen have shown normoplastic or hyperplastic marrows. The term pseudo-aplastic anemia may be a better term for an anemia with a blood picture suggesting aplasia but with a marrow that is normoplastic or hyperplastic.

DR JAMES A HALSTED Are there not some cases of acute aplastic anemia that recover spontaneously? I believe Dr Diamond has had four or five at the Children's Hospital following measles and mild upper-respiratory infections.

DR STRAUSS We have seen a few patients with pseudo-aplastic anemia who had remissions for limited periods of time, seldom however with a complete return of the blood to a normal state.

\* \* \*

Subsequent to this discussion, the patient developed a severe anemia and died, in spite of frequent transfusions. No autopsy was obtained.

## CASE 6386

## PRESENTATION OF CASE

A forty-year-old, Irish-American housewife entered the hospital with the complaint of pain in the right flank.

Nine years previous to admission she had had an attack of pain in both flanks associated with some difficulty in urination and was admitted to a hospital for treatment. At this time a diagnosis of pyelitis was made. About one year later she had had an attack of pain in the right lower quadrant which was diagnosed appendicitis, and an appendectomy performed. The appendix appeared normal, the peritoneal cavity was explored further, but no abnormalities were revealed. Cystoscopic and pyelographic examinations were made eleven days following the operation and showed some irregularity of the kidney pelves and what appeared to be calcified masses. A diagnosis of pyelitis was made, and the patient discharged. During the succeeding years intermittent attacks of dysuria occurred and were associated with chills and fever, and with pain and tenderness in the flanks. For several months preceding admission she had been free of symptoms, but two days before entry she experienced severe pain in the right upper quadrant, associated with nausea, vomiting and some fever. There was no dysuria. The pain became progressively worse and extended around to the right flank. She saw her physician and was referred to the hospital for observation.

Her past history revealed that she had had measles, mumps and whooping cough. When three years old a drainage of the right hip was performed, apparently for osteomyelitis. At the age of twenty-one she had had an operation in the right lower quadrant for intestinal obstruction, the cause of which was not known. Fourteen years before entry, following a stillbirth, there was swelling of the right hip, and a second incision and drainage. Catamenia had not been abnormal.

The patient's father and mother died of unknown cause while she was a child. There was no history of familial disease. She had been married for fifteen years, and except for the still birth, no pregnancies had occurred.

Physical examination showed a well-developed and well nourished woman in apparent agony. The temperature was 100°F, the pulse 100, the

respirations 22, and the blood pressure 88 systolic, 64 diastolic. The skin was warm, and there was no general lymph-node enlargement. Examination of the eyes, teeth, throat, heart and lungs was negative. The diaphragm was apparently higher than usual on the right. Abdominal examination showed spasm and a questionable mass in the right upper quadrant, and tenderness which extended around the right flank. A markedly tender spot was present in the right costovertebral angle. There was no tenderness in the left upper quadrant, in either lower quadrant, in the left costovertebral angle or over the spine. There was a definite shortening of the right leg. An old scar was present over the head of the right femur. There was some limitation of motion on flexion of the right hip, but no definite ankylosis. Knee jerks were present. Rectal and pelvic examinations were negative.

A catheterized specimen of urine with a cloudy straw color showed an acid reaction, a specific gravity of 1.011, a trace of albumin and no sugar, and the sediment contained 10 to 20 erythrocytes, 20 to 30 leukocytes and 3 to 10 squamous cells per high-power field. The white-blood-cell count was 29,000, and the red-cell count 4,700,000 with a hemoglobin of 80 per cent (Sahli). A differential count showed 86 per cent polymorphonuclears, 12 per cent lymphocytes, 1 per cent eosinophils and 1 per cent monocytes. The red cells and platelets appeared normal. The blood Hinton test was negative.

During her first two days' stay in the hospital her temperature ranged from 99 to 102°F., and she complained of constant pain in the region of the right costovertebral angle. On admission, treatment consisted of a high-fluid intake and urotropin and sodium acid phosphate. Pantopon was given once a day for the control of pain. Vomiting occurred once during the first two days, and the vomitus consisted of 120 cc of dark yellow fluid containing considerable mucus. The urine output varied from 900 to 2700 cc daily, with fluid intake varying from 1800 to 3000 cc. The third day after entry cystoscopic and pyelographic studies were made. These showed the bladder to be slightly but diffusely reddened and to present no areas of ulceration. The opening of the left ureter was patent and yielded apparently clear urine. A No. 6 catheter readily passed to the right kidney, and there was a flow of clear urine. A right-sided pyelogram showed the catheter to extend into the kidney pelvis. The minor calices appeared dilated, but the pelvis was normal in size. The ureter just below the pelvis appeared dilated. Both kidney outlines were obscured by

gas in the large bowel. The injected right kidney was normal in position.

A physical examination performed by a second physician showed findings similar to those first described and, in addition, a mass in the right upper quadrant which was tender on inspiration. There was more tenderness in the right flank than in the left, and this was present both anteriorly and posteriorly. On the fifth day after admission her



Figure 1 *Retrograde Pyelogram of the Left Kidney*

temperature fell to normal and did not go above 99°F for a period of four days, at which time it rose to 101°F and remained between this point and 99°F for the remainder of her stay. A Graham test done on the fifth day after admission was negative. A single film of the chest, with fluoroscopy, showed the right leaf of the diaphragm slightly elevated as compared with the left. Both were sharply domed and smooth in outline. Both costal angles were clear, and the diaphragmatic excursion was normal. There were several calcified areas in the right axilla and in the region of the left hilus. The lung fields were clear.

The pain in the right upper quadrant persisted, and she obtained very little relief from Pantopon and became restless and unresponsive. A non-protein nitrogen eight days after admission was 140 mg per cent. On the tenth day it was 210 mg per cent. A second pyelographic study was made, and the left ureter was catheterized, without evidence of obstruction. At first there was a flow of thin, slightly hazy urine, which in a short time changed to a discharge of pure pus. The right kidney was catheterized, and an intravenous

phenolsulfonephthalein test done. There was no dye excretion from the left kidney in about twenty-five minutes, and the amount coming from the right was too small to measure. A pyelogram of the left kidney showed dilatation and irregularity of the calices, a pelvis of normal size and a normal ureter (Fig 1). Examination of urine from the right kidney showed 3 to 10 leukocytes, no erythrocytes and 3 to 10 squamous cells per high-power field, urine from the left kidney, 10 to 20 leukocytes in occasional clumps, 3 to 10 erythrocytes and 3 to 10 squamous cells per high-power field, and the bladder specimen, numerous leukocytes in occasional clumps, 10 to 20 erythrocytes and frequent squamous cells per high-power field. Cultures of all three specimens showed *Bacillus coli*. Blood-pressure determinations were made daily after her eighth day of stay and showed a range of from 110 to 150 systolic, 70 to 100 diastolic.

Two weeks after admission the patient's restlessness increased and she soon became unresponsive and comatose. Death occurred on the fifteenth day of her hospital stay.

#### DIFFERENTIAL DIAGNOSIS

DR JAMES A. HALSTED: This record gives us the history of a forty-year-old woman whose symptoms began at the age of thirty-one, with evidence of bilateral kidney disease. The diagnosis of pyelitis was made at the onset, but she failed to improve on treatment. This suggests that there was some underlying cause for the pyelitis. A year after the onset she had an acute attack of abdominal pain, and a normal appendix was removed. The abdomen was explored, but exploration through an appendix incision does not necessarily rule out abnormalities in the kidney or gall-bladder region. At this time she had x-rays which showed calcified masses in the abdomen, probably tuberculous nodes, and abnormality of both kidney pelves. For the next eight years she had frequent attacks that appear to be typical of bilateral renal infection. The description of her pain on admission to this hospital two weeks before her death is a little more suggestive of an inflammatory process in the right upper quadrant than of her usual pain referred to the kidney. However, it did extend into the flank and she had dysuria, so that I believe it was caused by inflammation in or around the right kidney.

The past history is of interest in that she had chronic osteomyelitis of the right hip which might have been a focus for cortical abscesses or perirenal infection. The nature of the intestinal obstruction for which she had had an operation twenty years previously can only be guessed at.

It may have been due to tuberculosis in view of the x-ray evidence of healed tuberculous lymph nodes. Of possible significance is the fact that only one pregnancy had occurred, resulting in a stillbirth. Her chronic kidney disease may have been the cause for this.

The physical examination showed a patient with fever, agonizing pain and restlessness. There was a tender mass in the right upper quadrant, with spasm and tenderness in the right flank, and the diaphragm was higher than normal on the right.

The laboratory studies showed that there were pyuria, hematuria and marked leukocytosis. There was marked nitrogen retention, and practically no phenolsulfonephthalein excretion. Thus she had infected kidneys with renal insufficiency. It is of some interest that there was no hypertension, in fact the blood pressure tended to be abnormally low. In view of the evidence of calcified tuberculous nodes, one might venture the suggestion that she had Addison's disease, but I think the low blood pressure was due to the fact that she was extremely sick. Her course in the hospital was one of sepsis and uremia, progressing to death.

Will Dr Morrison now show us the x-rays?

DR SIDNEY L. MORRISON: As you see, there is a very marked curvature of the spine. These two films show the left kidney, while this one shows the right. The outlines of the kidneys are very indistinct and of bizarre arrangement, with dilatation of the calices on both sides. The right kidney is enlarged if this indistinct line is correctly interpreted as kidney margin.

DR HALSTED: Would you say there was any dilatation from ureteral obstruction?

DR MORRISON: I would not say it was ureteral obstruction because there is no evidence of ureteral dilatation and the catheter has gone up to each kidney.

DR HALSTED: Do you think the x-ray findings are consistent with polycystic kidneys?

DR MORRISON: I do.

DR HALSTED: It seems to me that the x-ray examinations in this case are of extreme importance in giving a lead as to the background for her chronic renal infection. In the differential diagnosis one must consider the following conditions. First of all, could this be obstruction as a result of stones, kinks or aberrant vessels? I do not believe it could be because the x-ray films should show more marked evidence of hydronephrosis at this stage, when she obviously had practically no functioning kidney tissue left. So I think we can rule out obstruction as a cause for her renal failure. Could the osteomyelitis have anything to do with it, such as being a focus for cortical abscesses and perinephric abscess? I should doubt it because the process is



too diffuse and of too long a duration. Could this be a tumor? Here again I think the duration is too long, and the process is bilateral, which would be very unusual. Next we come to the possibility of its being renal tuberculosis. We are fairly sure that she has had tuberculosis, as evidenced by the calcified nodes. However, the condition clinically and by x-ray soon after the onset eight years ago showed evidence of bilateral disease. Tuberculosis of the kidney practically always begins on one side, but later on may involve both kidneys. I do not know much about renal tuberculosis, but I should say that it usually does not terminate in uremia. Furthermore, she had a *B. coli* infection, which is an infrequent, though not impossible, finding with tuberculosis of the kidney. There is also liable to be more hematuria than she had.

Could this be simple chronic pyelonephritis? Certainly it could be, and without the x-ray pictures I should be forced to make that diagnosis. However, with these films I believe it is justifiable to go a step farther and make the diagnosis of congenital polycystic kidneys. One of the plates is typical, with a crescent-shaped calyx as a result of pressure from a cyst. The clinical course is entirely consistent with this condition. Patients with polycystic kidneys generally die in the fourth decade, which this patient did. They not infrequently have a significant degree of urinary infection. Characteristically they have bilateral palpable masses, which she did not have, but that does not rule out the diagnosis because we do not know how easy it was to examine her abdomen because of the tenderness and spasm. Furthermore, I do not believe the negative abdominal exploration nine years ago through an appendix incision ruled it out. Unless the kidneys were fairly large they would not have been felt. This is a fairly rare condition, but because of this characteristic x-ray picture I believe it was the background for secondary renal infection, with perinephric abscess from direct extension and death from uremia.

DR FRANKLIN G. BALCH, JR. Is pyelonephritis a common complication of polycystic kidneys?

DR. HALSTED. In one paper reviewing 60 cases, infection occurred in 50 per cent and was of serious nature in 35 per cent.

#### CLINICAL DIAGNOSES

Pyonephrosis, left  
Pyelonephritis, right  
Old osteomyelitis, right hip

#### DR. HALSTED'S DIAGNOSES

Congenital polycystic kidneys  
Pyelonephritis  
Perinephric abscess, right  
Uremia  
Healed tuberculosis of lymph nodes

#### ANATOMICAL DIAGNOSES

Congenital polycystic kidneys  
Pyelonephritis  
Perinephric abscess, right  
Bronchopneumonia  
Congenital cysts of liver  
Old osteomyelitis, right femur  
Cardiac hypertrophy  
Calcified axillary and iliac lymph nodes

#### PATHOLOGICAL DISCUSSION

DR. J. BEACH HAZARD. The autopsy findings were in complete agreement with Dr. Halsted's diagnoses. Both kidneys were markedly enlarged and increased in weight to 860 and 790 gm respectively, and presented the numerous thin-walled cysts typical of congenital polycystic kidneys. These cystic structures contained clear fluid, bloody fluid or purulent exudate. A perinephric abscess was present on the right. The heart showed moderate hypertrophy of the left ventricular wall, suggesting a precedent elevation of blood pressure. Three congenital cysts, 1 to 2 cm in diameter, filled with clear fluid, were present in the right lobe of the liver. Calcified lymph nodes in the axilla and iliac regions presented no active process to identify the etiologic agent. There was an old osteomyelitis of the right femur.

DR. HALSTED. Were the adrenal glands normal?

DR. HAZARD. Yes.

DR. GORDON MORRISON. What was the etiology of the perinephric abscess?

DR. HAZARD. This was caused by perforation of an infected cyst into the perinephric fat tissue.

## REPORT ON MEDICAL PROGRESS

## SYPHILIS

C GUY LANE, M.D.\*

BOSTON

GREATER strides have been made in the field of public-health work related to syphilis during the past two years than at any other comparable period of time in the history of the disease. Much of this effort has been directed toward bringing syphilis into the light of day, and teaching the population to realize that facing the problem exactly as one faces that of other infections will carry the fight farther than any other factor. Removal of the stigma of "social disease" is most difficult after centuries of custom, and this will not be accomplished for at least a generation. Meanwhile, emphasis on the need of early diagnosis and treatment, and on the great proportion of satisfactory results obtained by such management, cannot be too widely publicized.

The medical profession itself must not be forgotten, and some of its shortcomings need remedial action in order to further the cause. Many capable practitioners do not care to handle syphilis, or minimize the importance of adequate therapy. Others have not had an opportunity to become well acquainted with the disease and its care. Educational programs have for these reasons been undertaken by the majority of state societies, in the hope of bringing at least basic knowledge within the range of all. State-wide control programs have been inaugurated in many states and consultation services provided.

The cost of treatment for syphilis has in the past kept many patients from receiving proper care. This situation has been remedied to a large extent in many communities by the subsidization of clinics with state or federal funds. Where clinics are not available, the furnishing of free drugs to the physician leaves little excuse for neglect. Arrangements have been made through some county units for all cases to be treated regardless of economic status. Physicians in Massachusetts should not hesitate to avail themselves of the follow up service provided by the State Department of Public Health for tracing cases in need of active therapy and for locating contacts who may be infected. Syphilis can never be controlled so long as patients capable of transmitting the disease are not treated. This is a corollary to the fact that early and adequate therapy can wipe

out late cases in all but a gratifyingly low percentage. Contingent upon such a statement is the premise that the proper determination of cure requires lifelong observation.

Varying percentages on the incidence of syphilis among numerous population groups show wide discrepancies and have given rise to considerable disagreement. The statement that the incidence of the disease in the nation is close to 10 per cent may seem extreme, especially in rural practice, except for certain localities in the South. However, Vonderlehr and Usilton,<sup>1</sup> of the United States Public Health Service, have shown statistically that one person in every ten faces the probability of acquiring syphilis at some time during his span of life. This percentage, they show, is not indicated by routine checks under laws requiring physical examination before the issuance of a marriage license, or those made in industrial groups, or in general practice or any random population group, for several valid reasons. First, many persons have not yet acquired syphilis but are still in danger. Secondly, some patients who have had the disease give negative serological reactions and physical examinations because of treatment, while others who have been infected recover without treatment. Finally, a high percentage of cases have been removed from any given group by death. These authors further show that the results of better follow-ups indicate an encouraging decrease in the probability of disastrous outcome in inadequately treated syphilis.

Studies conducted by the Co-operative Clinical Group have stressed the importance of being absolutely certain of the diagnosis before commencing treatment for syphilis. It is held to be at least as great a mistake to treat a patient for syphilis who does not have it as to fail to carry out adequate therapy when a person is infected and requires therapy. Treating a patient for syphilis in the face of an unsubstantiated clinical diagnosis, equivocal serological reports without confirmatory physical evidence and the principle of anti-syphilitic therapy "when nothing else works" are deprecated under all circumstances by the group. It has shown that an accurate diagnosis can be made only through the intelligent use of efficient and accurate laboratory aids such as dark-field examinations, routine blood tests, spinal-

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fluid study where indicated and x-ray and fluoroscopic heart examinations, with an evaluation of all findings in the light of the history and physical examination. The probability of future damage will then be estimable, and the course of therapy will be indicated. If these principles are applied to a sufficiently large percentage of existing cases, it is asserted the disease may come under control, from a public-health standpoint, within a decade.

Studies of blood serological sensitivity and specificity have continued, and new or modified tests appear from time to time. At present any test which is less than 99 per cent specific and 65 per cent sensitive to syphilis is not satisfactory. The Hinton test done at the Wassermann Laboratory in Massachusetts fulfills these requirements. The policy of reporting blood tests as positive, doubtful or negative is advisable, since quantitative serological tests have not as yet been developed to the point where they are suitable for general use. In addition to this, they could not even then be used as a guide to treatment. The more rapid micro-precipitation tests are of great value under circumstances such as the testing of donors, but must be performed by skilled technicians. The advisability of having two or more tests done, preferably of different types and in different laboratories, cannot be overlooked.

New rapid blood tests which are proposed for the general use of the practitioner as simple, inexpensive, rapid and accurate, and as requiring no special technical training for their employment, should be accepted with reservations, especially if offered on a commercial basis. Studies have shown that such tests require considerable training and experience if they are to yield reliable results. But they may be quite comparable to the established tests if carried out as controlled laboratory procedures by competent technicians. There is at present no test for general use which is rapid, accurate, reliable, inexpensive and simple.

It is known that leprosy frequently causes a positive reaction in blood serological tests for syphilis, a few diseases of commoner occurrence in this country have been said to do so in a lesser percentage of cases. Malaria is perhaps the most notable of these, and an interesting study of the disease in this connection has been reported by Hazen and his co-workers<sup>2</sup> who studied 266 patients with no history or physical evidence of syphilis by means of the Hinton, Kline and Kolmer tests. Hazen quotes other authorities in order to show that malaria may act as a provocative agent in bringing a reagin of low titer up to the threshold where fixation of the complement becomes obvious in the tests. He concludes, how-

ever, that malaria can be the cause of positive serological reactions to tests for syphilis.

Encouraging progress has been made in the field of spirochete stains for both tissue sections and direct smears from open lesions. These methods are being simplified and speeded up by various modifications, so that we may hope that they will prove practicable in the not too distant future. Such stains would be of great value in early cases where we now rely on dark-field examinations.

The value of studying patients with urologic disease for syphilis has been brought out by Friedman and Mazer.<sup>3</sup> An unselected group of 252 such patients were questioned as to the history of syphilis and were examined in a cursory manner, unless findings indicated more investigation, and blood tests were done three times at monthly intervals. Seventy-three patients (29 per cent) were found to have syphilis. The value of such work lies in the finding of new and unknown syphilis and previously undertreated cases.

Wile<sup>4</sup> emphasizes the part that syphilis may play in surgery. He believes that there is little risk to the operator if an accidentally infected wound is made to bleed freely and is immediately treated with strong calomel ointment. In patients with syphilis of long standing there is no danger to the operator if the patient has been adequately treated. The patient's benefit from surgery is seriously endangered in active syphilis, as sites of surgical procedures are ideal foci for acute syphilomas. Old cases previously well treated are good risks, but in untreated cases several weeks of fairly intensive therapy should precede the surgery, and treatment should be continued through convalescence.

A study of the infectiousness of the semen of patients with late syphilis has been carried out by Kemp,<sup>5</sup> who summarizes the reports in the literature and adds 15 animal inoculation cases of his own. His conclusions are that spirochetes are present in the semen of early cases in about the same percentage as in the other body fluids. There is no adequate reason for belief in the infectiousness of the semen of patients with late syphilis.

Persistent emphasis on the extreme importance of the continuous method of therapy in early syphilis, in contradistinction to the intermittent plan, is the theme of numerous reports. Enough evidence has accumulated to make continuous therapy a routine procedure. There is also no doubt that patients who neglect their treatment may be considered to have been handled on the intermittent plan and thus to have decreased their chances of satisfactory outcome.

Studies of various drugs used in the treatment

of syphilis have continued. Further experiences with Mapharsen by various observers indicate that it is satisfactory, and is comparable to the arsphenamines for routine employment. The lower degree of toxic manifestations makes it more desirable in many cases. The use of Mapharsen has not shown it to be more efficacious than the other arsenicals for serofast cases, as was previously claimed.

Several new arsenicals have been studied, of both trivalent and pentavalent type. So far these have proved of less value than already established drugs, or have been subjected to a trial insufficient to warrant their general acceptance. This should serve as a warning to physicians against any such new product, whether urged upon them through mail advertising or in direct solicitation by drug salesmen.

Considerable literature has appeared on the oral administration of bismuth, and commercial propaganda has been prominent, but more data as to its ultimate value are required before it can be recommended. Oral therapy is certainly as much to be desired for syphilis as for diabetes and numerous other maladies, but in so grave a situation we cannot be too exacting in our demands for adequate scientific proof of the efficacy of the compounds advocated. The conclusions of the most competent investigators are, however, that the oral administration of bismuth merely justifies more extended and controlled clinical trial. Pains-taking experimental research and prolonged, rigidly controlled clinical study, concerning late as well as immediate effects, are necessary before such agents can be accepted. The newer drugs do not as yet meet these requirements, and when they do, the fact will be made known through medical publications, not through detail men.

Continued studies on the absorption and excretion of bismuth given intramuscularly indicate that the oily suspensions of insoluble salts and some of the oil-soluble products are the best vehicles for routine use. It is necessary to administer the drug often enough to maintain a constant effective level in the blood stream. This is measured accurately and conveniently by means of a recently developed rapid method for the estimation of the excretion of bismuth in the urine, which reflects the blood content. Oil suspensions of bismuth may be administered in suitable weekly doses, and oil-soluble preparations in bi-weekly doses, both these provide a slowly attained but sustained level of the metal in the blood stream. Aqueous or ethylene-glycol solutions give a more rapid effect, but are excreted so quickly that they must be injected three times weekly.

The use of mercury in the management of syphilis should not be forgotten. This is emphasized by Wright,<sup>9</sup> who places the relative effectiveness of arsenic, bismuth and mercury in the treatment of syphilis in the ratio of 10 : 7 : 4. He summarizes the indications for mercury as follows: for cases intolerant to arsenic or bismuth or both, as an alternate drug when the patient is saturated with arsenic and bismuth, in syphilis resistant to arsenic and bismuth, for recurrences after the use of arsenic and bismuth, as an alternate drug in serofast syphilis, for the reinforcement of arsenic and bismuth, in ocular syphilis, in visceral syphilis, in involvement of the central nervous system, and for certain congenital cases. These statements do not apply to oral administration.

Fever therapy in early syphilis, alone or combined with chemotherapy, should be regarded as strictly experimental. It seems to intensify the curative action of chemotherapeutic agents, and in time some combination of the two modes may be worked out. At present, however, such a technic should not be routinely applied to early syphilis.

The investigation of fever therapy for syphilis is being constantly extended, and this method is now well accepted, after a thorough trial of chemical agents has been applied, in the following manifestations of the disease: syphilis of the central nervous system, interstitial keratitis, resistant cutaneous or osseous involvement, and, occasionally, relapsing early syphilis. Fever therapy has been found to be of no material value in latent syphilis, cardiovascular syphilis, syphilis involving the liver or stomach and late syphilis of the mucous membranes. When satisfactory response to fever occurs, it is assumed that such results are due to some fundamental change in the immunologic processes of the body, the nature of which is still unknown. The utmost care is necessary in the selection of patients as satisfactory risks. The method of production of fever, among the many advocated, which will give the most gratifying response, with the most prolonged maintenance of results and the least harmful side actions, has not yet been ascertained. Many years of study of end results will be required in order to determine the most satisfactory method.

The possibility of syphilis in pregnancy must be kept constantly in mind if there is to be a reduction of the number of innocent victims of the congenital form of the disease. Congenital syphilis is preventable, and with adequate co-operation of the public and the medical profession it can be eliminated. Conservative opinion today holds that every woman who has ever been diagnosed as syphilitic should have some active treatment dur-

ing every subsequent pregnancy, regardless of the status of her serological test or the extent of previous therapy. In this connection it must be borne in mind that one negative blood test in pregnancy may not reflect the true status of past or suspected syphilis. The effect of the arsphenamines on the fetus has been studied recently by Vamos and Böhm.<sup>7</sup> The only way to protect the fetus, they assert, is to immunize the mother thoroughly, and thus the fetus indirectly. This fact again proves the extreme importance of energetic treatment of the infected mother before and throughout pregnancy.

In all infants born of syphilitic mothers, all authorities agree that the diagnosis must be proved as surely as in acquired syphilis. Where there is reason to suspect the disease and the first investigations are negative, diagnostic procedures should be repeated at monthly intervals, and later less often, for several years. No offspring of a mother in any stage of syphilis, "cured" or not, should be discharged until after several years of adequate follow up. Once the diagnosis of syphilis has been established, it must be remembered that no infant is too young to receive active arsenical and heavy-metal therapy in appropriate doses.

Tertiary asymptomatic syphilis provides our most delicate problems of therapy. Individualization of cases here becomes especially necessary. Three types of cure may be considered: biologic cure, which is in all probability seldom if ever attained; serologic cure, which is of course desirable but not always essential; and symptomatic cure, whereby the patient becomes and remains non-infectious and well, so far as syphilis is concerned, for the duration of his life. In these so-called latent cases it is not always advisable to begin immediate treatment. Study of the entire medical status of the patient is indicated, with consideration of any other disease he may have, and judgment as to whether anti-syphilitic therapy may aggravate existing conditions. The problems of immunity in regard to treatment have given rise to considerable discussion. Kolmer<sup>8</sup> has covered this phase of syphilis in a well planned series of animal and human studies. Among other problems he considers the question whether positive serology in an apparently healthy patient with previous adequate therapy always means the persistence of syphilitic infection and also whether this state requires further treatment. Kolmer believes it possible that the acquired immunity of syphilis is responsible for clinical latency but that this immunity cannot be relied upon alone to maintain latency indefinitely or to provide complete recovery without the aid of modern treatment. Serological relapse is thus interpreted as

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In cardiovascular syphilis, one of the most fruitful recent reports is that of Wile and Snow<sup>9</sup> on the asymptomatic group. In a third of 210 cases of uncomplicated aortitis, aortic insufficiency and aneurysm they found the disease to be symptomatically occult. In addition, a fair percentage of the patients were devoid of any clinical evidence of cardiovascular involvement. It is emphasized that during the period of latency the cardiovascular system should be under constant suspicion, and that the significance of the most minor symptoms or findings should be thoroughly investigated. In x-ray diagnosis it has been brought out by Padgett and Moore<sup>10</sup> that the left anterior oblique position for teleroentgenography, preceded and supplemented by fluoroscopy, seems the most promising method of examination and should be further elaborated.

The most informative report on syphilis of the central nervous system to be recently published is that of the Co-operative Clinical Group<sup>11</sup> on tabes dorsalis. Nine hundred and eighty-five cases formed the basis for this report. It is a long and comprehensive study which merits thorough perusal. The blood Wassermann test was found to be an inefficient guide in the diagnosis or treatment of tabes, being negative in 32 per cent of the cases with a positive spinal fluid. The degree of positivity of the spinal fluid allowed a fairly accurate estimation of the prognosis and proved a fair guide as to the type of therapy needed. The disease may progress clinically even with a negative spinal fluid. Improvement in the spinal fluid more often preceded clinical response, but the latter did not always take place after the fluid became negative. Routine chemotherapy brought about a response in the spinal fluids of 29 per cent of 396 cases in which this method alone was employed. (Note that this is not 29 per cent of the entire group studied.) A combination of routine chemotherapy, intraspinal injection and malaria brought about a response in the shortest space of time. Routine treatment plus tryparsamide was the slowest method. Artificial methods of inducing fever had not been introduced at the time this study was begun. Routine treatment with arsenic

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and blanching was recommended for not over one year, to be followed by supplementary methods at the end of that time if the spinal fluid was not responding, or sooner if the routine therapy was found inadequate to stop progression. The same applied to symptomatic response. The clinical results were likewise calculated the conclusion being that a combination of routine plus intraspinal or malaria therapy was the most satisfactory method. Trypanamide was helpful but of less value in stopping active progression of the disease. Fourteen per cent of the cases progressed in spite of treatment. Intraspinal therapy was more effective than other supplementary modes, regardless of the stage of the case at the start of treatment, seven or more such treatments were required. Diplopia gave the best response and optic atrophy the poorest. It was brought out that no accurate estimate of the value of any treatment program can be made for tuber disease until the incidence of cases is known in which the symptoms of the disease disappear spontaneously as well as those which progress to the end point.

A controversy has been going on as to whether a negative blood Hinton indicates a negative spinal fluid. Margolis<sup>11</sup> has added some data for consideration, in a study of 111 cases. Among these were 172 positive spinal fluids, of which 11 showed negative blood Hinton tests. All these patients and considerable clinical evidence of injury to the central nervous system. Margolis therefore concludes that asymptomatic neurosyphilis associated with a persistently negative blood Hinton must be rare, and that routine spinal fluid may be omitted in patients with no clinical evidence of the central nervous system and a persistently negative

blood Hinton reaction. However this subject cannot yet be considered closed.

Numerous reports are available on complications occurring during antisyphilitic therapy, but cannot be discussed here. Some of the more interesting of these include liver damage following arsenical therapy,<sup>12,13</sup> dermatitis due to arsenicals,<sup>14</sup> hematopoietic depression<sup>1</sup> and the role played by vitamin C.<sup>15</sup>

I am indebted to Dr. G. Marshall Carver for assistance in preparing this report.

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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25041

#### PRESENTATION OF CASE

A fifty-eight-year-old housewife was admitted complaining of postmenopausal vaginal bleeding.

Two and a half years before admission she had been examined and curetted at an outside hospital for vaginal bleeding. The pathological examination showed no evidence of cancer. The bleeding continued as bright-red blood, and she had required a pad ever since that time. Two weeks before entry she began having chills, fever and local tenderness in the lower abdomen, with the passage of a profuse, saffron-colored, watery, vaginal discharge. A palpable, tender mass was noticed in the left lower abdomen. Since that time there had been no passage of blood. She had no gastrointestinal or urinary symptoms, or no gain or loss of weight. Years ago she had had a fallopian tube, an ovary and the appendix removed.

Physical examination showed an obese woman, with tenderness and spasm in the left lower abdomen. The head and chest were negative. The breasts showed evidence of cystic mastitis. The blood pressure was 134 systolic, 78 diastolic. In the left lower quadrant of the abdomen there was a large, soft, somewhat irregular mass about 10 cm in diameter, which extended to the midline. Pelvic examination showed an essentially normal cervix. The right vault was fuller than the left, and a fluid wave was elicited in ballotting the mass between the left lower abdomen and the examining finger. The mass was possibly continuous with the uterus.

The temperature was 102°F, the pulse 100, the respirations 28.

The urine examination was negative, except for the presence of 20 to 30 white cells per high-power field. The blood showed 65 per cent hemoglobin and a white-cell count of 14,500. The sedimentation rate was 1.3 mm per minute.

Under ether anesthesia another vaginal examination was performed. A large, smooth, rounded mass could be felt occupying the left vault and extending halfway to the umbilicus. It was definitely cystic and seemed adherent behind a small, atrophic uterus.

Following this examination an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. GEORGE VAN S. SMITH: \* As is very often true in gynecological cases, one cannot commit oneself unequivocally to a single diagnosis here, for the data presented lend themselves to explanation by a variety of pathologic entities.

I feel justified in dismissing at once from consideration, first, the patient's cystic mastitis—because of our lack of knowledge of any causal relation between pelvic disease and this disease, secondly, carcinoma of the vagina or cervix—on the basis of examination, and thirdly, all benign causes of uterine bleeding—because it is practically axiomatic that benign processes rarely produce persistent, unmodified, bright-red bleeding before the menopause, and never after the menopause—with the possible exception of benign granulosa-cell tumors. Even with a granulosa-cell tumor I should expect a history at least suggestive of some periodicity of flow and of blood at times more or less like that of menstruation. Furthermore, against granulosa-cell tumor are the small uterus, indicating absence of prolonged estrogenic stimulation, and the negative pathological report on the original curettage. If there had been real hyperplastic endometrium due to granulosa-cell tumor, the report would probably have hedged on the possibility of cancer. Two and a half years of bleeding from a uterus that is still small and atrophic makes cancer of the endometrium only a remote guess. Thus far I have concluded that cancer was the cause of this patient's flowing and that it was not in the uterine cavity.

If a patient presents herself complaining of postmenopausal bleeding and if careful examinations with biopsies fail to reveal the cause, we have found it safer to proceed with abdominal exploration immediately after recurrence of the bleeding. In such a case we expect to find one of the following four conditions: adenocarcinoma in the myometrium, primary in an area of adenomyoma, primary carcinoma of a fallopian tube, primary carcinoma of an ovary, with involvement of tube or uterine wall or both, or metastatic tumor. These may cause bleeding from the uterus without yielding any palpable or biopsy evidence of their presence.

From the history and general examination, metastatic tumor may be ruled out. Again, because of the small uterus, cancer in the myometrium with cystic involvement of the ovary is improbable.

\* Visiting surgeon, Free Hospital for Women, Brookline, Massachusetts; instructor in gynecology, Harvard Medical School.

Her loss of a tube and ovary years ago suggests that she had had a conservative operation for pelvic inflammation. Since the cystic mass of her present illness was on the left, I presume that the left adnexa had been saved.

At this point I picture the following course of events: a left tubo-ovarian abscess years ago resulting in a tubo-ovarian cyst, later, development of cancer of the tube or ovary with bleeding into the uterus, and, finally, an acute inflammatory exacerbation, with rupture of a septum in the ovary and escape of yellowish, watery material through the tube and uterus.

It hardly seems likely that the acute inflammation which precipitated her entry to the hospital could have been due to retrograde infection through the uterus, especially when it was apparently draining the tube satisfactorily. Furthermore, chills and a fever of 102°F seem more than would be expected in such a chronic situation. I should rather incriminate the bowel as the source of this infection—adhesions between the sigmoid and the tubo-ovarian cyst, diverticulum, and acute inflammation with increase in the size of the cyst and in tension, resulting in escape of fluid through a tube containing a primary cancer, which may also have involved the ovary. I suspect that the post-operative course was stormy.

DR. JOE V. MEIGS: How frequently do you see carcinoma of the tube in your hospital?

DR. SMITH: We have seen at least 5 cases, 2 in the past year.

DR. LANGDON PARSONS: That is interesting because we apparently never had a proved carcinoma of the tube in this hospital until 1932. People reporting now claim there is an increasing incidence of carcinoma of the tube. I believe one is justified in saying it is rare, because at the Johns Hopkins Hospital<sup>1</sup> 5 cases in a total of 35,000 have been reported, and at the Bellevue Hospital<sup>2</sup> 3 cases in a total of 30,000. I personally have seen 2 cases within a week, having seen it previously but once. Since that time Dr. Joe V. Meigs has seen 2 cases within another two weeks. That makes 4 cases within the course of a month. The impression is that the condition is rare, but the importance lies in the fact that it is a very malignant tumor. In fact it is the most malignant of all the genital tumors. There are only 7 cases recorded in the literature that have lived longer than three years. That is of considerable importance, especially if it is true that there is an increasing number of cases. We have seen only 6 cases in this hospital, and 2 at the Pondville Hospital.

So far as we can find out from the literature the train of events is very similar to that presented by the patient Dr. Smith has discussed. The inter-

esting thing to me is that the fimbriated end of the tube apparently closes late in the disease. Because the cancer only involves the tubular wall as a late manifestation, the early picture is one of hydrosalpinx, with which it is frequently confused. In fact one of these cases had a salpingectomy on one side, the surgeon believing that the lesion was a simple hydrosalpinx. Because of the enormous distention and thin wall, carcinoma was not suspected. Bilateral lesions are often found.

Many of these patients give a history of vaginal staining accompanied by intermittent colicky lower abdominal pain, which is relieved by a sudden vaginal discharge of pus or blood. The mechanism may well be a late closing of the fimbriated end of the tube, with sudden distention of its thin wall to form a huge hydrosalpinx. The colic arises in an attempt to extrude the necrotic contents into the uterus, with relief when this takes place. This sequence of events closely simulates an acute pelvic inflammation. It occurs often enough to be considered as a syndrome by many writers.

DR. MEIGS: I have seen 2 cases which have not shown inflammation. The first of these I operated on in New York at the Post-Graduate Hospital, the other I operated on here in Boston a year ago. In the latter patient, a mass was attached to the posterior uterine wall that felt like a fibroid. Curettage was negative. She continued to bleed, and I operated later and found the tumor. There was no inflammatory process. The 2 other cases I have seen had pelvic inflammation.

DR. PARSONS: The important diagnostic point is the finding of a negative endometrium in an atrophic uterus in a patient who is bleeding after the menopause.

#### CLINICAL DIAGNOSES

Carcinoma of the fallopian tube  
Pyometra

#### DR. SMITH'S DIAGNOSES

Carcinoma of the fallopian tube  
Tubo-ovarian abscess

#### ANATOMICAL DIAGNOSES

Papillary adenocarcinoma of the fallopian tube  
Follicular cysts of the ovary  
Tubo-ovarian abscess

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: Whenever a new disease appears, one always begins to wonder as to why that disease has not been seen before. There is no question that new diseases do develop from

time to time Infectious diseases formerly limited to animals may spread to man, new processes in industry introduce new toxicologic factors, physicians themselves are only too often the culprits, and in their attempts to cure one disease, they upset a delicate balance and produce another But I do not believe that new diseases are particularly frequent or that many new forms of cancer develop Yet we begin to hear from time to time of what are to us new forms of cancer This has been borne out very strikingly in the case of cancer of the lung Up to about 1920 it was supposed that primary carcinoma of the lung was one of the rarest of all forms of pulmonary cancer Now we firmly believe it is one of the commonest No one has been able to decide with any certainty whether the number of cases has actually increased It is quite possible that it has, but it is equally possible that we are simply recognizing it where we failed before

It has always been a tradition in pathology that cancer of the fallopian tube is extremely rare, and as a result, pathologists have almost never made the diagnosis unless they could exclude all other possibilities If they found cancer limited to the tube, they might be willing to make the diagnosis, but if there was the remotest involvement of the ovary or uterus they would always say it came from one or the other of those two sources We unquestionably have missed many cases in the past by such an attitude

In this particular case I think there is very little doubt the lesion was primary in the tube If one wished to be hypercritical about it, I do not believe that we could say we are certain beyond all doubt There was involvement of the ovary, and it is conceivable that the tumor started there On the other hand there was one recognizable follicular cyst left in the ovarian tissue If the tumor had started there, probably the whole ovary would have been destroyed and it is unlikely that the entire tube would have been involved from end to end and have been so elongated So in this case I think in all probability the carcinoma arose in the tube That is the diagnosis we finally made

DR MEIGS To what was the inflammation due?

DR PARSONS There was a large inflammatory cyst of the ovary which had twisted on itself behind the uterus and had stuck to the sigmoid The cyst was ruptured and removed

DR MEIGS It was adherent to the sigmoid?

DR PARSONS Yes, very definitely

DR MEIGS The patient I saw in New York had complete involvement of the left tube Both ovaries were normal in size In the right tube there was a very small tumor hanging off the fimbriated end I think it is rather striking that

both tubes were involved and both ovaries were negative

DR PARSONS According to the literature the cancer is apt to be bilateral

DR SMITH In the 2 cases that I have seen both patients had bilateral lesions

A PHYSICIAN Was postoperative radiation given in these cases?

DR PARSONS That is the one hope, of course On none of those recorded has anything been done beyond a palliative course of x-ray treatment, which was not given with any hope of cure That may be a way of prolonging the survival period

DR BENJAMIN CASTLEMAN I should like to ask Dr Smith how often he has seen ovarian cancer that involved the tube and not the endometrium That might be a differentiating point

DR SMITH I cannot recall a case where the tube was involved and not the endometrium

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### CASE 25042

#### PRESENTATION OF CASE

A twenty-one-year-old, married woman was admitted complaining of frontal headaches, failing vision and vomiting

The patient had not matured mentally after the age of twelve She was described as "silly," had a morbid sexual curiosity, and began a promiscuous life, which resulted in pregnancy and childbirth at the age of fourteen Soon after this she developed pulmonary tuberculosis She entered a sanatorium three years before admission, where a diagnosis of active tuberculosis was made by x-ray, positive sputum examinations and symptoms, including weight loss, loss of appetite and night sweats During that year a left phrenectomy was done, followed by a thoracoplasty with the resection of nine ribs on the left side The following year, after a period of riotous living, she had a hemoptysis followed by collapse During the two years before entry she was confined twice in psychopathic hospitals for attempted suicide Three months before entry, while working as a waitress, she began feeling more tired and weak than usual and having frontal headaches of increasing severity Draining ears had been present intermittently since childhood, and one month before admission she had a recurrence, with earache Two weeks later her frontal headaches became constant and very severe A week before entry they became unbearable and precipitated two or three episodes of vomiting daily Her vision began failing three days before admission, equally in both

eyes During the previous three months she had had no cough, fever or night sweats, but had lost 10 pounds in weight One month before entry a sanatorium refused admission on the ground that her tuberculosis was inactive

At the age of twelve she had had an appendectomy, and at fifteen a tonsillectomy At seventeen she had had a cesarean section and unilateral salpingo-oophorectomy for her second pregnancy Her family history was noncontributory

Physical examination showed a pale, sallow, poorly nourished girl who was dazed and staring from a severe headache Co-operation was poor, the patient was somewhat confused, although she was apparently well oriented The left pupil was larger than the right, both reacted to light External ocular movements were normal She had a right homonymous hemianopsia Visual acuity was 20/50 in the right eye and "fingers at two feet" in the left Examination of the fundi showed 4 diopters of choking of the left disk, with hemorrhages and engorged veins The right disk was similar, with 2 diopters of choking There was weakness of the right lower face Left mastoid tenderness and bilateral antral tenderness were elicited There was deafness in the right ear, a whisper being heard at 2 feet, whereas in the left ear it was heard at 10 feet Air conduction was greater than bone conduction bilaterally The Weber test was positive on the right The right tympanic membrane was moderately retracted but otherwise normal, the left was normal Examination of the mouth revealed tender and bleeding gums The tongue deviated to the left Above the left clavicle there was an old phrenectomy scar A moderate amount of left thoracic scoliosis was present There was a left thoracoplasty scar, well healed, with no ribs palpable beneath it The scar overlay an area of complete dullness and absent breath sounds There were no rales in the remainder of the chest, even after coughing The heart was normal The blood pressure was 110 systolic, 68 diastolic There were healed operative scars in the right upper quadrant and left lower quadrant of the abdomen There was tenderness in both these areas, as well as in the left upper quadrant, but no masses Pelvic examination showed a red and inflamed cervix The fundus of the uterus could not be outlined, but the vaginal vaults were negative Rectal examination was negative There was weakness of the right arm, and slight weakness of the right leg All the tendon reflexes were more active on the right side than on the left, and there was a Babinski sign on the right.

The temperature was 99°F (rectally), the pulse 60, the respirations 18

The urine contained 20 to 25 white cells per high-power field The blood showed a red-cell count of 4,640,000, 80 per cent hemoglobin, and a white-cell count of 10,700 with 71 per cent polymorphonuclears A blood Hinton was negative. A lumbar puncture revealed an initial pressure of 310 mm of water The spinal fluid was clear and colorless, without cells The total protein was 19 mg per cent, the sugar 72 mg, the goldsol curve negative, and the Wassermann test negative.

X-ray films of the skull appeared normal Chest films showed the left thoracoplasty involving the upper eight ribs, but no evidence of active disease in either lung A ventriculogram showed marked symmetrical dilatation of the lateral ventricles and only a small quantity of air in the anterior aspect of the third ventricle There was no air in the fourth ventricle The area of the third ventricle appeared to be occupied by an irregular tumor which bulged into the inferior margins of both lateral ventricles but more on the left side

On the third hospital day the patient's condition seemed definitely worse Burr holes were made and the ventricles tapped, with the removal of about 30 cc of fluid which had a total protein of 6 mg per cent She then seemed slightly improved On the following day a ventriculogram was done After a diagnosis of third-ventricle tumor, a left-sided, extensive, subtemporal, osteomyoplastic decompression was done No exploration was attempted For several days her condition progressively improved On the seventeenth hospital day she was up and around, though mentally retarded X-ray therapy was begun, 1200 r being given over a period of ten days through the right lateral skull, directed to the third ventricle On the twenty-first hospital day at 5.30 p m the patient became irrational and cried out loudly at times Four hours later she suddenly became pale and went into coma Her respirations were slow, irregular and gasping, her pulse rate dropped to about 50 After treatment for shock, the ventricles were tapped, the spinal fluid gushing out under high pressure The following morning she showed improvement and was rational but in the evening became worse The ventricle was again tapped, with improvement On the thirty-first hospital day, she was discharged home to her physician Following discharge her condition remained essentially unchanged until the evening of the fourth day after discharge, at which time she passed away suddenly, being found dead by the nurse on return to the patient's room after a few moments' absence

## DIFFERENTIAL DIAGNOSIS

DR GILBERT HORRAX \* This case is a puzzle neurologically, and a very fascinating one. It is obvious that we have to do with a condition of increased intracranial pressure which may be caused by one of a variety of pathologic conditions. At least the patient had a background for various etiologic factors. In the first place, she had had active tuberculosis, and in the second place, she had led a promiscuous sexual life, giving her a fair chance for syphilis, although the spinal-fluid Wassermann was negative, as was the blood Hinton. In the third place, she had had an opportunity for an intracranial lesion from the fact that she had had running ears intermittently since childhood, with a recent exacerbation. Aside from all these factors, there is, I believe, the more probable chance that she had a true neoplasm rather than a granulomatous tumor, because in my experience large tumors of luetic or tuberculous origin are extremely rare. I do not recall having seen a tuberculoma or syphiloma in the position in which this tumor has been demonstrated by the ventriculogram, and the same is true of ordinary abscess. It is an extremely unusual place for any one of these lesions.

We have other evidence of localization besides the ventriculogram, of course, because she had a right homonymous hemianopsia and a right Babinski sign, with increased reflexes on the right, together with some weakness of the right face, arm and leg. Just what the pupillary inequality meant is problematical, but the pupils did react to light, which, if the tumor pressed very firmly on the corpora quadrigemina, should not occur. If there was marked pressure she ought to have had restriction of the ocular movements upward. It is said in the report of the ventriculogram that the tumor mass bulged more to the left than to the right, which would agree with the neurological evidence as presented. In other words, we come down to a lesion which has been demonstrated by ventriculogram to bulge from below upward into the third ventricle. This places the site of the lesion very accurately. One must comment, therefore, as to its pathologic type, and as I said, syphiloma, tuberculoma or abscess is unlikely. This brings it down to some form of true neoplasm, and in that category one has to deal with two or three possibilities.

The most interesting of these, and one which I should like to see demonstrated, is a pinealoma. I doubt that it was a pinealoma, because almost always such a tumor causes pressure on the cor-

pora quadrigemina and eye signs and symptoms result that are at variance with the normal ones described. One could possibly interpret the sexual precocity as further evidence of a pinealoma, but the strange thing about such an assumption is that the syndrome of *pubertas praecox* has never been described in a girl. The other common types of neoplasms in this situation are glioblastomas, astrocytomas and, less frequently, ependymomas. There are other possibilities, of course, but these are the most usual ones. On the evidence, my guess is that it was some form of glioma rather than a pinealoma.

DR JAMES R LINGLEY The plain films were essentially negative, except for questionably increased intracranial pressure as suggested by the convolutional markings. The sella turcica was normal in size and shape. After air injection the tumor was very well demonstrated along its anterior and superior margins. Here you can see air entering the anterior portion of the third ventricle and outlining the anterior margin of the mass lying in the posterior portion of the ventricle. Then there is pressure upward from the mass into the cavities of the lateral ventricles so that one can also outline the extent of the superior margin of the tumor. It appears to arise in the floor of the third ventricle. It is anterior to the pineal gland.

DR CHARLES S KUBIK Does the anteroposterior view show the third ventricle?

DR LINGLEY There is hardly enough air in the third ventricle to be visible in the anteroposterior view. This view does show the tumor pressing upward a little more into the left lateral ventricle than into the right.

DR HORRAX Dr Ayer, do you think there is any spread in these ventricles?

DR JAMES B AYER It seems as if there were some spread.

DR HORRAX Tumor outline perhaps?

DR AYER There is tumor in between.

DR LINGLEY It does not appear to infiltrate the septum pellucidum. It presses upward into the lateral ventricles from below.

DR AUGUSTUS A ROSE The spinal-fluid protein was 19 mg per cent.

DR AYER That is low but not significantly so.

DR HORRAX In the x-ray film the outline of the tumor looks more sharply defined than one would expect to find with a diffuse glioma. This suggests an ependymoma or craniopharyngioma. The lack of calcification, of course, is against the latter.

DR ARLIE V BOCK What about the sexual precocity?

DR HORRAX You can have sexual precocity in young individuals with cerebral tumors other than pinealomas. It occurred in one of my patients who had a glioma in the region of the third ventricle, but it has never been reported as arising from an intracranial lesion in girls.

DR AYER Was this sexual precocity or delinquency? She was delinquent in every way.

DR HORRAX I do not know, however, I should not expect this tumor to be a pinealoma for various other reasons. My first diagnosis is a glomatous tumor of the third ventricle, but I mention ependymoma and craniopharyngioma as possibilities.

DR JAMES C WHITE Of course we did think very seriously of Dr Horrax's suggestion of pinealoma. I went over her several times to see if I could find any impairment in the upward deviation of the eyes, without success. We had thought from the x-ray films that the tumor lay in the floor of the third ventricle and infiltrated outward to the left or else pressed from outside the ventricle and bulged in. In either case we believed that it was an infiltrating glioma and, being on the left side, that it was quite inaccessible. Hence, after consultation with a good many members of the staff, only decompression and radiation were done. Three weeks after her death a very similar case came in, and having learned from this experience, we all made a correct diagnosis. Dr John S Hodgson operated, and the patient made a successful recovery.

#### CLINICAL DIAGNOSIS

Glioblastoma  
Medulloblastoma?  
Tuberculoma?

#### DR HORRAX'S DIAGNOSIS

Glioblastoma  
Ependymoma?  
Craniopharyngioma?

#### ANATOMICAL DIAGNOSES

Cholesteatoma  
Persistent thymus

#### PATHOLOGICAL DISCUSSION

DR KUBIK The tumor was a cholesteatoma or so-called "pearly tumor." The mass, measuring from 3.5 cm to 4 cm in diameter, was situated a little to the left of the midline between the optic chiasm and the cerebral peduncles. Extending upward, it displaced the third ventricle upward and to the right. The left cerebral peduncle and optic tract were both flattened by it.

These tumors have a glistening pearly appearance. They are avascular and easily broken up into flaky and irregular fragments, which have something like a cheesy consistence and, when rubbed between the fingers, feel a lot like soap. The outside of the tumor is covered with an exceedingly thin membrane lined with flat epidermal cells containing granules of keratohyaline. There are no dermal structures, such as sebaceous or sweat glands, as in dermoid cysts, which may also be found in the suprasellar region. The pearly substance consists of desquamated, flat, epithelial cells and contains a certain amount of fat and some cholesterol.

DR MALLORY One thing that the discovery of the nature of this tumor proves is that it was unquestionably present for a long period of time. I have no idea how many years it would take for a cholesteatoma of this size to develop, but they are very slow-growing and a tumor large enough to produce some symptoms may have been present even in her childhood.

DR HORRAX I believe they are congenital. Do you not think so?

DR MALLORY Yes. The only other abnormality that was found at autopsy was a very large and active-looking thymus gland. The genital tract—what was left of it—seemed normal.

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## HOSPITALS AND THE DOCTOR

Boston is proud of its hospitals and its doctors. They have made this city one of the really great medical centers of the Western Hemisphere.

Fifteen of Boston's hospitals are members of the Community Federation and depend for a large part of their support on the Greater Boston Community Fund. In 1938, Community-Fund hospitals supplied 763,155 days of hospital care to 70,252 patients, half of whom paid nothing or only a fraction of the regular charge. More than a million examinations and treatments were provided by outpatient departments and dispensaries. Visiting nurses from organizations supported by the Community Fund made 277,623 calls to 44,354 patients. This is a splendid record of accomplishment.

But, to quote President Conant, of Harvard University, speaking recently to a group of work-

ers in Greater Boston's 1939 Community Fund Campaign:

The list of things that these institutions could not accomplish because of lack of funds is long and the implication of these deficiencies serious. What the meaning of these deficiencies would indicate in terms of the alleviation of human suffering, no one can predict. It is not enough to recount merely the number of free beds for the care of patients that should be added or the need for increased convalescent care for little children and for enlarged staffs of visiting nurses. It is not only the support of the needs of the local hospitals that is at stake, unless these institutions are in sound financial health they cannot be the centers for the type of fine medical work for which this city has long been famous.

No one will deny the importance of good hospitals to medical education and the advancement of medical knowledge. To quote Dr. Conant again:

The care of the sick, the training of doctors and the advancement of medical knowledge are all aspects of the work of the modern hospital which are intimately associated with each other.

I want to emphasize that after a man has received his medical degree he gets the final and all important part of his training in the hospital, quite apart from any connection with the medical school. Every one of us who has reason to be grateful to a physician or surgeon has reason to be grateful to our hospitals.

Every agency that promotes the improvement of medical care, the bettering of medical education and the advance of medical knowledge should receive the whole-hearted support of all members of the medical profession, even though it necessitates a certain amount of personal sacrifice. Do not fail to contribute to the Community Fund!

## DR. CANNON HONORED BY NATIONAL SOCIETY

THE election of Dr. Walter B. Cannon as president of the American Association for the Advancement of Science is a fitting recognition of a great leader in American science. The list of his published writings—about two hundred and forty titles in all—is long and impressive, so too is the list of honors that have been heaped on him from far and wide. But impressive as are these evidences of achievement, they are wholly inadequate

to portray the warm-hearted human being whose wise guidance has inspired countless disciples and sent them forth equipped to carry on scholarly researches in physiology, and thus bear the torch of his learning to the ends of the earth

Dr Cannon has made his own way in the world. Coming from the Middle West to Harvard, unknown and without friends in the East, he worked his way through college and then, after his graduation from the medical school in 1900, rose rapidly to the front rank of the world's great scientists.

His first notable achievement was the ingenious study of the digestive tract by mixing an insoluble radiopaque salt with food and then observing and photographing the resulting shadow obtained by means of the roentgen ray. This expedient served his research at the time, and has served diagnosis ever since, all over the world. In 1911 the results of the investigations thus begun were assembled in a volume entitled *The Mechanical Factors of Digestion*.

During this early stage in his career, only six years after graduation from medical school, he was appointed George Higginson Professor of Physiology, a post he has held for thirty-two years and still holds.

To his penetrating insight significant effects of strong emotion on the digestive functions then revealed an important field of research. The effects of emotional states on physical well-being had been the subject of much loose thinking and lack of thinking, they had been capitalized by faith healers of many cults and had been dismissed with skepticism by physicians of small vision. Dr Cannon placed an important group of phenomena in this hitherto shadowy realm on a scientific foundation. These researches dealt chiefly with the control of endocrine secretions through the sympathetic nervous system. Of these experiments Dr William H. Howell\* said:

It is the information they have brought us in regard to the physiological significance of this diffuse append

age to the central nervous system that I would reckon as Cannon's most important contribution. He conceives of the sympathetic system as not essential for the bare maintenance of life under uniform or protected conditions, but as fulfilling the functions of an emergency mechanism which comes into play under the strain of marked environmental changes, such as exposure to cold, hypoglycemia, asphyxia, muscular effort and, especially, strong emotional excitement. Under these conditions the system is reflexly affected as a whole with the results of an increased secretion of adrenalin, a mobilization of sugar in the circulation, a more rapid heart beat, a change in the distribution of blood, an increase in the circulating red corpuscles and a deeper ventilation of the lungs, all of them reactions that tend to put the animal into a more favorable condition to protect itself from environmental stresses.

Dr Cannon has conveyed the idea of the emergency function of the sympathetic nervous system and of its important effector, the adrenal medulla, with the vivid simile "placing the body on a war footing."

This thesis is developed in the volume *Bodily Changes in Pain, Hunger, Fear and Rage*, published in 1915. The book presents one of the most important concepts of modern science, drawn from a bewildering mass of observations. In this array of physical facts, which to a lesser mind would be unrelated, Dr Cannon, combining the vision of a philosopher with the observation of a scientist, saw a great biological truth.

Professor C. Macfie Campbell, drawing the moral for the medical profession, compared the outworn point of view to a study of the blood chemistry in Dr Cannon's experimental cats by an investigator who was ignorant of the all important emotional stimulus provided by the barking dog. "We study the cat and forget the dog." Dr Cannon long ago recognized that functional stress may lead in time to structural change, the diagnostician who does not know this truth may well mistake effect for cause.

From these studies Dr Cannon was drawn into the maelstrom of war-time medicine. Going overseas in April, 1917, as a first lieutenant in the Medical Corps of the United States Army, he was rapidly promoted to the rank of lieutenant colonel, while his duties correspondingly increased in im-

Howell W. H. B. Cannon 1906-1931 94 pp. Cambridge Harvard University Press 1932 P. 28



portance During this period he served with Professor W M Bayliss on the English Committee on Shock, and thus brought his research acumen and experimental skill to bear on a problem in surgery which the casualties of war had raised to one of supreme importance In this assignment Dr Cannon played a major part in establishing the important conclusion that secondary surgical shock is largely due to absorption of toxic material from masses of damaged tissue For this work he was made a Companion of the Bath by the British Government in 1919 and awarded the Distinguished Service Medal by the United States Government in 1922.

After the war Dr Cannon returned to his researches on the sympathetic nervous system and endocrine glands His further work revealed the important substance or substances which he designated "sympathin," whose function as a mediator of smooth-muscle action is a key to much that is new and important in physiology He then introduced another broad concept, "homeostasis" or the property of the organism whereby it compensates for a variety of disturbing influences and thus maintains the "steady states" which must surround the tissues of the body if they are to live and function This concept is set forth in *The Wisdom of the Body*, published in 1932, in which he advances more boldly than in previous works the philosophic implications

And still with tireless zeal his quest for new truth goes on May it go on for many years to come, for every year brings large rewards in knowledge, the quest of which is his chief joy and the fruits of which enrich the world of learning

## SECTION OF OBSTETRICS AND GYNECOLOGY

RAYMOND S TITUS, M.D., *Secretary*  
330 Dartmouth Street  
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### POSTPARTUM HEMORRHAGE

Mrs M S, a thirty-six-year-old gravida III at term, entered the hospital on October 2, 1933, for elective induction the following day

A series of selected case histories by members of the section will be published weekly  
Comments and questions by subscribers are solicited and will be discussed by members of the section.

Her past history included measles, mumps, chickenpox and diphtheria Her tonsils had been removed Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted six days Her last period was December 21, 1937, making her expected date of confinement September 28 In June, 1933, she had had a labor which was terminated by version, the baby weighing over 9 pounds Her past history was otherwise non-contributory, as was the family history

Her present pregnancy had been normal She was first seen on August 25, when she was about thirty-six weeks pregnant Her weight was 146 pounds, which was a gain of 18 pounds beyond her usual weight Her heart was not enlarged, there were no murmurs Her lungs were clear and resonant, there were no rales On September 29, four days before induction, she weighed 144 pounds Her blood pressure was low—104 systolic, 60 diastolic, the urine contained no albumin

On October 3 at 9 a m after castor oil and quinine, the uterus was definitely irritable Vaginal examination showed the cervix to be flat, the external os admitted one finger, and the internal os was entirely obliterated The membranes were ruptured artificially, with the escape of a large amount of fluid One minim of pituitary extract was given At 12.30 p m rectal examination showed that the head was in the pelvis and that the cervix was dilated to the width of one finger, labor had not yet been well established At 3.45 p m rectal examination showed the head low and the cervix three-quarters dilated Six grains of Nembutal had been given at 2 p m, but this had been vomited, 6 gr were then given by rectum A normal ODP delivery was accomplished at 4.26 p m The baby was a male weighing 9 pounds, 13 ounces The placenta followed immediately at 4.30 p m and was intact, with membranes complete There was more than the normal amount of fresh bleeding, but the uterus contracted well after the usual injection of pituitary extract and Ergotrate

An hour later the patient began to bleed, but not an unusual amount Her color was good, her pulse rate was 80 Not long after this she had no radial pulse and no appreciable blood pressure, in spite of which her color was good, she was not sweating, and she was warm Since it did not seem that she had lost enough blood to account for her condition, it was inferred that she was suffering from shock, and she was given an ampule of 50 per cent glucose intravenously This raised her blood pressure to 85 systolic, and her pulse became palpable at the wrist, with a rate of 110 The uterus became flabby, in spite of intravenous pituitary extract By 6.30 p m she was

to portray the warm-hearted human being whose wise guidance has inspired countless disciples and sent them forth equipped to carry on scholarly researches in physiology, and thus bear the torch of his learning to the ends of the earth

Dr Cannon has made his own way in the world. Coming from the Middle West to Harvard, unknown and without friends in the East, he worked his way through college and then, after his graduation from the medical school in 1900, rose rapidly to the front rank of the world's great scientists

His first notable achievement was the ingenious study of the digestive tract by mixing an insoluble radiopaque salt with food and then observing and photographing the resulting shadow obtained by means of the roentgen ray. This expedient served his research at the time, and has served diagnosis ever since, all over the world. In 1911 the results of the investigations thus begun were assembled in a volume entitled *The Mechanical Factors of Digestion*

During this early stage in his career, only six years after graduation from medical school, he was appointed George Higginson Professor of Physiology, a post he has held for thirty-two years and still holds

To his penetrating insight significant effects of strong emotion on the digestive functions then revealed an important field of research. The effects of emotional states on physical well-being had been the subject of much loose thinking and lack of thinking, they had been capitalized by faith healers of many cults and had been dismissed with skepticism by physicians of small vision. Dr Cannon placed an important group of phenomena in this hitherto shadowy realm on a scientific foundation. These researches dealt chiefly with the control of endocrine secretions through the sympathetic nervous system. Of these experiments Dr William H. Howell\* said

It is the information they have brought us in regard to the physiological significance of this diffuse append-

age to the central nervous system that I would reckon as Cannon's most important contribution. He conceives of the sympathetic system as not essential for the bare maintenance of life under uniform or protected conditions, but as fulfilling the functions of an emergency mechanism which comes into play under the strain of marked environmental changes, such as exposure to cold, hypoglycemia, asphyxia, muscular effort and, especially, strong emotional excitement. Under these conditions the system is reflexly affected as a whole with the results of an increased secretion of adrenalin, a mobilization of sugar in the circulation, a more rapid heart beat, a change in the distribution of blood, an increase in the circulating red corpuscles and a deeper ventilation of the lungs, all of them reactions that tend to put the animal into a more favorable condition to protect itself from environmental stresses

Dr Cannon has conveyed the idea of the emergency function of the sympathetic nervous system and of its important effector, the adrenal medulla, with the vivid simile "placing the body on a war footing."

This thesis is developed in the volume *Bodily Changes in Pain, Hunger, Fear and Rage*, published in 1915. The book presents one of the most important concepts of modern science, drawn from a bewildering mass of observations. In this array of physical facts, which to a lesser mind would be unrelated, Dr Cannon, combining the vision of a philosopher with the observation of a scientist, saw a great biological truth.

Professor C. Macfie Campbell, drawing the moral for the medical profession, compared the outworn point of view to a study of the blood chemistry in Dr Cannon's experimental cats by an investigator who was ignorant of the all important emotional stimulus provided by the barking dog. "We study the cat and forget the dog." Dr Cannon long ago recognized that functional stress may lead in time to structural change, the diagnostician who does not know this truth may well mistake effect for cause.

From these studies Dr Cannon was drawn into the maelstrom of war-time medicine. Going overseas in April, 1917, as a first lieutenant in the Medical Corps of the United States Army, he was rapidly promoted to the rank of lieutenant colonel, while his duties correspondingly increased in im-

man, Clarence L. Scamman, M.D., Charles F. Wilinsky, M.D., Frank Kiernan, Gaylord W. Anderson, M.D., Walter P. Bowers, M.D., Ida M. Cannon, Curtus M. Hilliard, Horace Morison, B. Harrison Ragle, M.D., and Wilson G. Smillie, M.D.

## MAINE NEWS

### GRADUATE FELLOWSHIPS IN OBSTETRICS AND GYNECOLOGY

The Bingham Associates Fund, by offering fellowships, is affording practicing physicians of Maine the opportunity to pursue a course of graduate study in the field of obstetrics and gynecology in Boston. This work will be conducted under the control of the faculty of Tufts College Medical School. The facilities of the New England Medical Center, the Joseph H. Pratt Diagnostic Hospital, the Boston Dispensary and the Evangeline Booth Maternity Hospital will be utilized.

The Evangeline Booth Hospital, with about five hundred deliveries a year, is under the control of the professor of obstetrics of Tufts College Medical School. All the clinical teaching material at this institution will be available for the benefit of these fellows. By observation and actual personal delivery of patients, the most modern methods and the most rigid technic of good hospital obstetric practice will be demonstrated and taught. Much time will be devoted to prenatal clinic examinations and care, and also to ward rounds for instruction in postpartum care.

These fellowships are for one month each and are available to graduates of approved medical schools. Each one-month fellowship carries an honorarium of \$250. Rooms and meals are available for fellows at reduced rates in the Medical Center. Any Maine doctor wishing to secure such a fellowship is requested to write to Samuel Proger, M.D., 25 Bennet Street, Boston, Frederick R. Carter, M.D., 22 Arsenal Street, Portland, Maine or Frederick T. Hill, M.D., Professional Building, Waterville, Maine.

## NOTES

The Maine Board of Registration of Medicine has recently announced that the following physicians have been licensed to practice medicine and surgery in Maine, as of November 9, 1938: Henry S. Hebb, M.D., Bridgton; Thomas B. Hovie, M.D., Belfast; Theodore J. Hughes, M.D., Portland; Paul A. Jones, M.D., Union; and Joseph P. Seltzer, M.D., Fairfield.

The following physicians have become members of the Maine Medical Association: Androscoggin—James Sansoucy, M.D., Lewiston; Cumberland—Carl Corson, M.D., Robert T. Phillips, M.D., and E. Allen McLean, M.D., Portland; Hancock—James H. Crowe, M.D., Ellsworth.

## CORRESPONDENCE

### REGULATIONS RELATIVE TO TRANSFUSIONS

*To the Editor*—At the last meeting of the Department of Public Health, on Tuesday, January 10, the following Regulations Relative to the Use of Blood or Other Tissues for Purposes of Transfusion, etc. were passed, effective ninety days from date of adoption, that is, on April 10, 1939.

These regulations have been prepared only after consultation with representatives of hospitals, of the Massachusetts Medical Society, of the Massachusetts Hospital Association

and of serologists and syphilologists. Doubtless they will be in conflict, here and there, with present practice, and possibly the conflict will be serious. We trust that if they prove to be unreasonable under certain circumstances, the attention of the Department will be called to the fact in order that they may be so amended as to be reasonable.

The suggestion is offered by the Department that much of the annoyance of blood testing for syphilis may be overcome by the use of rapid or exclusion blood tests, which may be performed within a relatively few minutes just before the transfusion. Such a test, when performed in a laboratory approved by the Department for making such tests, being performed not only within the thirty days first mentioned in the regulations but also within the five days mentioned later in the regulations, will take the place of both.

The State Wassermann Laboratory is prepared to assist in the training of technicians in the performance of rapid tests and to provide the antigen for their performance. Any hospital or institution wishing to have its technician trained or to obtain antigen should communicate with Dr. William A. Hinton at the Wassermann Laboratory, 25 Shattuck Street, Boston.

PAUL J. JAKMAU, M.D.,  
*Commissioner of Public Health*

State House,  
Boston.

\* \* \*

### REGULATIONS RELATIVE TO THE USE OF BLOOD OR OTHER TISSUES FOR PURPOSES OF TRANSFUSION, ETC.

(Under the provisions of the General Laws,  
Chapter 111, Section 6.)

No person shall introduce the blood or any unsterilized fraction of the blood or tissue of any person, hereinafter called the donor, into the body of another person, by transfusion or otherwise, unless said donor has never had syphilis or malaria and is found to be free from infection with any disease transmissible by such transfusion or introduction of blood or tissue and which has been declared by the Department of Public Health to be dangerous to the public health, so far as such freedom from past and present infection may be determined by the following examinations and tests:

1. A history, carefully taken by a registered physician immediately before the said transfusion or introduction of blood or tissue, as to past or present infection with syphilis or malaria and as to possible exposure to syphilis within the preceding two months and as to signs or symptoms of infection with any disease dangerous to the public health at the time of the examination.

2. A careful physical examination by a registered physician immediately before the said transfusion or introduction of blood or tissue, to consist at least of a careful inspection of the skin from head to feet for enanthem, of the genitalia for any lesion or scar, and the temperature.

3. A blood test for syphilis made upon a specimen of the donor's blood, collected not more than thirty days prior to the date of transfusion or introduction of blood or tissue, provided that, in the case of an emergency transfusion, if no previously tested donor is immediately available and a rapid blood test for syphilis cannot be made, the blood test hereinbefore required may be omitted but such omission and the reason

oozing a good deal more than she should have been and looked poorly, there was no clotting. The uterus was packed, and no cervical laceration was found. Because of the hemorrhage it was decided to give a transfusion, but this was not done so quickly as it should have been, due to difficulty in obtaining a suitable donor. The uterus remained flabby. The patient continued to flow, in spite of the pack. It was evident that all the blood going in was coming out, and hysterectomy was decided upon. A second transfusion was given. As soon as another donor was available, a third transfusion was started and the patient prepared for operation. Hysterectomy was performed very quickly. No blood was found in the peritoneal cavity. At the conclusion of the operation some blood did come from the vagina but not more than 100 cc. There was no immediate change in the patient's condition. A fourth transfusion was begun as soon after the operation as another donor could be obtained. Respirations ceased before this transfusion was completed.

An autopsy, performed eleven hours post mortem, showed nothing abnormal except for an increased number of normoblasts in the bone marrow. The uterus measured 7 by 12 by 8 cm. On section the myometrium was 4 cm. in thickness, it was soft and pale brown, and numerous dilated sinuses could be made out between the muscle fibers. The uterine cavity was smooth, and there were no hemorrhagic points. The decidua vera was pink and quite thin. There were no obvious cervical lacerations. On section, the muscle bundles were seen to be separated by wide spaces, a few of which contained red blood cells, the capillaries were dilated.

*Comment* There are several interesting points about this case. Her appearance was deceptive. Her condition was not appreciated, and transfusion was not done so soon as it should have been. The blood did not clot. It is perfectly possible that her blood pressure was negligible long enough to have interfered with the functioning of the cerebral tissue. She undoubtedly bled more than was realized, this resulted in shock which was so profound that it caused absolute atony of the uterus, from which she did not rally, even after several transfusions.

There is very little more to add about this catastrophe. The difficulty in getting a compatible donor was unfortunate. A blood bank would have obviated the delay and possibly saved the patient's life.

Born in Roxbury, she received her degree from Tufts College Medical School in 1900. She was a member of the American Medical Association and the Massachusetts Medical Society. A former school physician, she had been associated with the Massachusetts General Hospital, the Children's Hospital and the New England Hospital for Women and Children.

A sister, Dr. Elizabeth T. Gray, and a nephew survive her.

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**McKALLAGAT**—**PETER L. McKALLAGAT, M.D.**, of Lawrence, died January 20, at Miami, Florida. He was in his fifty-seventh year.

Dr. McKallagat received his degree from Columbia University College of Physicians and Surgeons in 1906. He was a member of the American Medical Association and of the Massachusetts Medical Society.

His widow, a daughter, a son and three sisters survive him.

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**STAPLES**—**CLARENCE H. STAPLES, M.D.**, of 180 Summer Street, Malden, died January 17. He was in his sixty-second year.

Born in Lunenburg, he graduated from the Boston Latin School, from Wesleyan University and, in 1904, from the Harvard Medical School. He was an intern for two years at the Boston City Hospital and opened practice in Malden in 1906.

Dr. Staples founded the Malden Contagious Hospital and was a member of the staff of the Malden Hospital. He was a member of the American Medical Association and the Massachusetts Medical Society.

His widow, a son, Dr. Clarke Staples, two daughters, a brother and two grandchildren survive him.

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## MISCELLANY

### GEORGE H. BIGELOW MEMORIAL

The George H. Bigelow Memorial Committee has completed its task and turned over to the Boston Medical Library \$1038.30, which has been contributed by Dr. Bigelow's friends.

This money was given for the purpose of providing a permanent fund, the income of which is to be used to purchase books on public health, cancer, medical economics and related subjects. The books are to be selected by a committee composed of the librarian of the Boston Medical Library, the dean of the Harvard School of Public Health and the commissioner of public health. A section in Holmes Hall has been set apart for these books.

As a nucleus for this collection, the Commonwealth Fund of New York has contributed fourteen volumes of their publications and a few writers on public health have donated copies of their books. It is hoped that additional gifts of books or money for the Bigelow Library will be made from time to time and sent to the librarian of the Boston Medical Library.

Two friends of Dr. Bigelow who prefer to be anonymous have presented to the library a bookplate, designed by Miss Mary Sears, to be placed in each book purchased from the fund. Each donor to the fund has received a print of the bookplate. All who have seen it believe that it is an excellent likeness of Dr. Bigelow and that the design as a whole is of unusual merit.

The following were members of the George H. Bigelow Memorial Committee: Henry D. Chadwick, M.D., chair-

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## DEATHS

**GRAY**—**ALICE M. GRAY, M.D.**, of 149 Warren Street, Roxbury, died January 18.

Saturday, February 18—Hospital Case Presentation. Dr S J Thannhauser  
 Tuesday, February 21—Allergy Clinic with Case Presentation. Dr E. A. Brown.  
 Thursday, February 23—Medical-Social-Service Case Presentation. District Service and Social-Service staffs.  
 Friday, February 24—The Present Status of Specific Therapy for Pneumonia. Dr Maxwell Finland.  
 Saturday, February 25—Hospital Case Presentation Dr S J Thannhauser  
 Tuesday, February 28—Diabetic Clinic. Dr Joseph Rosenthal

#### ALUMNI DAY, NEW YORK UNIVERSITY COLLEGE OF MEDICINE

Alumni Day of New York University College of Medicine will be held on February 22. Following opening remarks by Dr Edward S Rimer, president of the Alumni Association, and Dr E. D. Friedman, the morning will be devoted to a series of formal lectures on 'Diseases of the Chest, which will be given at the medical school Luncheon at the school will be followed at the Bellevue Hospital by clinic and case demonstrations concerning pulmonary disease. Late in the afternoon Dean Currier McEwen will be host at an informal reception in the Dean's office.

Alumni who expect to attend the meeting are requested to communicate with the secretary of the Alumni Association, Dr Phineas Bernstein, 1100 Park Avenue, New York City

#### CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Haverhill	February 1	Arthur T Legg
Lowell	February 3	Albert H. Brewster
Salem	February 6	Harold C Bean
Brockton	February 9	George W Van Gorder
Gardner	February 14	Mark H Rogers
Springfield	February 15	Garry deN Hough, Jr
Worcester	February 17	John W O'Meara
Pittsfield	February 20	Francis A. Slowick
Fall River	February 27	Eugene A McCarthy
Hyannis	February 28	Paul L. Norton

#### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3.30 p. m. on Thursday, February 2, in the amphitheater of the Peter Bent Brigham Hospital, Dr Henry A. Christian, Hersey Professor of the Theory and Practice of Physic, Harvard Medical School and physician-in-chief, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.

#### MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday, January 31, at 5 00 p. m.

#### PROGRAM

Prostagmin. Dr Henry R. Viets  
 Radioactive Iodine. Dr Saul Hertz  
 Development of Emphysema in Chronic Bronchial Asthma Dr Tracy B Mallory  
 Studies of Plasma Volume. Dr Edward Hamlin, Jr  
 HENRY K BEECHER, M.D., *Secretary*

#### FAULKNER HOSPITAL CLINICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, February 2, at 5 00 p. m.

There will be a discussion of cases by Dr Henry C Marble and Dr Theodore L. Badger

#### WORCESTER DISTRICT MEDICAL SOCIETY

The next meeting of the Worcester District Medical Society will be held at the Worcester State Hospital, on Wednesday, February 8

A Swiss motion picture The Eternal Mask will be shown. It is a dramatic and imaginative study of a patient who develops a psychosis.

GEORGE C TULLY, M.D., *Secretary*

#### TRUDEAU SOCIETY

A meeting of the Trudeau Society will be held on February 2 at the Beth Israel Hospital, at 8 15 p. m.

Dr Edgar Mayer, assistant professor of medicine at Columbia University College of Physicians and Surgeons, will speak on 'Diet in the Treatment of Tuberculosis'. Discussion will be opened by Drs Ernest B Emerson and Leon Alley

Physicians and students are cordially invited to attend.

MOSES J STONE, M.D., *Secretary*

#### LAWRENCE CANCER CLINIC

The regular Lawrence Cancer Clinic, to be held at the Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, February 7, at 10 00 a. m., will be a demonstration and teaching clinic for physicians, with Dr Channing C. Simmons, of Boston, associate in surgery in the courses for graduates at Harvard Medical School, surgeon-in-chief to the Collis P Huntington Memorial Hospital, member of the Cancer Commission of Harvard University, and consulting surgeon to the Massachusetts General Hospital, present as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society

ROY V BAKETEL, M.D.,  
 CHARLES J BURGESS, M.D.,  
 JOHN J McARDLE, M.D.,  
 HARRY H. NEVERS, M.D.,  
 THOMAS V UNLIG, M.D.,  
 J FORREST BURNHAM, M.D., *Chairman*

therefor shall be made known to the recipient if possible, or to the recipient's guardian or nearest relative if available, and shall be noted in the record herein-after described.

4 Exception. If an infant under two weeks of age is to be transfused with, or to receive an injection of blood from its own mother, the examination or testing of said mother for syphilis or any other disease dangerous to the public health is not required under these regulations

At the time of transfusion a specimen of the donor's blood and a specimen of the recipient's blood shall be collected for subsequent test for syphilis, provided, that if a blood test for syphilis was made upon the donor's blood within five days before transfusion, said specimen need not be collected, and provided, that if the recipient's blood was tested previously during said recipient's present hospitalization, or present illness if not in a hospital or institution, said specimen of the recipient's blood need not be collected.

Each and every specimen of blood to be tested for syphilis under the provisions of these regulations shall be forwarded, within twenty-four hours after collection, to the laboratory where the test is to be made, said specimen of the donor's blood to be labeled "blood donor—emergency if a prompt report is desired. Each and every blood test for syphilis, made under the provisions of these regulations, shall be made in the Wassermann Laboratory of the Department of Public Health or in a laboratory approved by the Department for performing blood tests for syphilis

The name, age, sex, color, marital status and address of both donor and recipient, the type of blood test performed, the results of the tests and examinations herein required, by whom performed, the date of the transfusion, the name of the physician who performed it, the omission of any blood test herein required and the reason therefor, shall be entered in the permanent records of the hospital, institution, clinic or physician under whose jurisdiction the transfusion was performed, and in such a manner that all of the said data may be readily located by reference to the recipient's medical record.

No blood, drawn for deferred transfusion, herein after called banked blood, shall be used for such transfusion, which has not been drawn under the provisions of these regulations as they apply to the donor of blood for non-emergency transfusions, provided, that the date of collection for banking shall be substituted for the date of transfusion, and provided, that the recipient's medical record shall identify the bank from which blood was used rather than the donor or donors to the bank, and provided, that the name, age, sex, color, marital status and address of the donor, the results of the tests and examinations of the donor herein required, by whom performed, and the date of collection of the donor's blood for banking shall be entered in a permanent record which shall identify the bank to which said donor contributed blood.

Approved and adopted at a meeting of the Department of Public Health held on January 10, 1939 Effective ninety days from date of adoption

## CONTRACEPTIVE ADVICE

To the Editor Since the *New England Journal of Medicine* is the official organ of the Massachusetts Medical Society, it is reasonable to assume that the opinions ex-

pressed in its editorials are not merely the personal opinions of one or more editors but represent the official attitude of the Society as a whole. The statement that the *Journal* does not hold itself responsible for statements made by any contributor certainly does not relieve it of responsibility for statements made in its editorial columns

The editorial of January 5, entitled "The Legal Status of Contraceptive Advice in Massachusetts," offends the consciences of a great many members of the Society

May I ask you for myself personally and out of consideration for the many Catholic members of the Society to make it plain without delay on the editorial page of the *Journal* that the opinion on birth control expressed in the above mentioned editorial does not represent the official stand of the Massachusetts Medical Society?

MARGARET C. McMAMAMY, M.D.

40 Lakewood Street,  
Worcester, Massachusetts

The editorial to which our correspondent refers represents no official stand of the Massachusetts Medical Society. It does express an opinion of the editorial staff concerning the right of physicians to practice their profession according to its rules of ethical conduct and according to their own consciences. It is not intended to offend any member of the Society, nor, we believe, will it do so in the case of those who still believe in the principles of free opinion, free speech and freedom of religious worship on which this country was founded. Ed

## NOTICES

### JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston  
Auditorium, 9-10 a. m.

#### MEDICAL CONFERENCE PROGRAM, JANUARY FEBRUARY

- Tuesday, January 31—Hemolysins and Hemolytic Anemia. Dr William Dameshek.
- Wednesday, February 1—Hospital Case Presentation. Dr S J Thannhauser
- Thursday, February 2—Group Treatment of Psychoneurosis. Dr H. I. Harris
- Friday, February 3—Epidemiological Aspects of Tuberculosis. Dr A S Pope.
- Saturday, February 4—Hospital Case Presentation. Dr S J Thannhauser
- Tuesday, February 7—Diagnosis of Certain Shoulder Conditions. Dr J D Adams
- Wednesday, February 8—Hospital Case Presentation. Dr S J Thannhauser
- Thursday, February 9—The Present Status of Vitamin B. Dr L. R. Weiss
- Friday, February 10—Recent Studies on Gout. Dr J H Talbott.
- Saturday, February 11—Hospital Case Presentation. Dr S J Thannhauser
- Tuesday, February 14—The Significance of Anal Bleeding. Dr E T Whitney
- Wednesday, February 15—Hospital Case Presentation. Dr S J Thannhauser
- Thursday, February 16—Electrocardiographic Changes in Pericarditis. Dr C P Roberts
- Friday, February 17—Differential Diagnosis of Coronary Thrombosis. Dr Cadis Phipps

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NUMBER 5

## THE PROTEAN CHARACTER OF THE LEUKEMIAS AND OF THE LEUKEMOID STATES\*

HENRY JACKSON, JR., MD †

THE classic features of both the acute and the chronic leukemias are well known to all, and lead in the majority of cases to a correct diagnosis and thus to appropriate treatment and accurate prognosis. There are, however, certain deviations from the usual picture which, though uncommon, are of practical importance because of their diagnostic, therapeutic or prognostic implications. Not all patients having the peripheral blood picture of leukemia actually suffer from that disease, not all cases of leukemia present, in the early stages of their disease at least, those features by which we are accustomed confidently to diagnose the condition. It is our present purpose to describe briefly some of these borderline cases.

It is generally agreed that, on the average, the chronic leukemias, whether myelogenous or lymphatic, terminate fatally in about three years from the onset of symptoms.<sup>1</sup> All too frequently, the course is even more rapid. Yet there are, rarely, notable exceptions to this general rule, and these very exceptions should render us cautious in our initial prognosis, particularly when the patient is relatively symptom-free at the time the condition is discovered. Some 10 per cent of patients with chronic leukemia, whether lymphatic or myelogenous, survive more than five and up to ten years.<sup>1</sup> Very rarely they live even longer.

*Case 1* I E., a 69 year-old woman, complained early in 1929 of lassitude, loss of strength and generalized aches and pains. There were no more specific symptoms. On examination she was found to be a frail woman, older than her years would indicate. The lungs were clear, the heart was normal. There was moderate arteriosclerosis. The spleen was felt 2 cm below the costal margin, the liver was just palpable on inspiration. There was slight generalized lymphadenopathy. Otherwise the physical examination was essentially normal. The red-cell count was 4 800 000 and the hemoglobin 85 per cent. The

white-cell count was 59,000, with 99 per cent mature lymphocytes. The platelets were present in normal numbers. By all criteria the patient had chronic lymphatic leukemia and death would have ensued within the next 2 or 3 years, if one were guided by the general averages which apply to this disease. Yet her condition has remained essentially unchanged to the date of writing. From time to time she has been given high voltage x-ray therapy over the splenic area. Her weakness has continued, and indeed increased, her strength has gradually failed, yet in May, 1938, 9 years after onset, the red-cell count was 4,100,000 and the white-cell count was only 16,800, with 72 per cent mature lymphocytes, 20 per cent mature polymorphonuclears and 8 per cent monocytes. Senility seems to be increasing, yet the leukemia remains essentially unaltered, indeed, it can hardly be said to have contributed in any important manner to her present state.

*Case 2* F B M., a 42 year-old man, noticed in 1926 a generalized, painless lymphadenopathy, otherwise he felt perfectly well. Physical examination showed great enlargement of the lymph nodes in the neck, axillas and groins. The nodes were rubbery in consistence, discrete and freely movable. They varied in size but averaged about 4 cm in diameter. The spleen reached nearly to the iliac crest. The liver could not be felt. The white cell count was 186,000, with 93 per cent mature lymphocytes and 7 per cent polymorphonuclear neutrophils. The red-cell count was 4,350,000. The general condition was good and there were no complaints besides the enlarged lymph nodes, which caused him some worry and were naturally disfiguring. From time to time since 1926 he has received x-ray therapy over the splenic area and the enlarged lymph nodes. With each treatment the white cell count has fallen markedly, only to rise once more in a few months to its previous level. The lymph nodes have fluctuated in a similar manner. The spleen has remained consistently large; indeed, it has always been of unusual size for a case of lymphatic leukemia. In May, 1938, 12 years after onset of his illness, the patient still showed marked lymphadenopathy. The white-cell count was 138,000, with 97 per cent mature lymphocytes. The red-cell count was 4,300,000 and the hemoglobin 85 per cent. Blood platelets were present in normal numbers. The spleen still reached to the iliac crest, but the patient was in excellent general condition, and was able to carry on an active and profitable insurance business.

The most protracted case we are aware of was observed by McGavran.<sup>2</sup> We have reviewed the autopsy material from this case and there can be no question as to the correctness of the diag-

\*From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, the Department of Medicine, Harvard Medical School and the Collis P. Huntington Memorial Hospital, Harvard University.

†Assistant professor of medicine, Harvard Medical School, associate physician, Thorndike Memorial Laboratory, Boston City Hospital and Collis P. Huntington Memorial Hospital, Harvard University.

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JANUARY 30

## TUESDAY JANUARY 31

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hemolysins and Hemolytic Anemia Dr William Dameshek
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 5 p m. Massachusetts General Hospital Hospital Research Council Ether Dome
- 8 30 p m Norfolk District Medical Society Evans Auditorium of the Massachusetts Memorial Hospitals 78 East Concord Street Boston

## WEDNESDAY FEBRUARY 1

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*12 m Clinicopathological conference. Children's Hospital amphitheater

## THURSDAY FEBRUARY 2

- 8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Peter Bent Brigham Hospital
- \*9 10 a m Joseph H Pratt Diagnostic Hospital Group Treatment of Psychoneurosis Dr H I Harris
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital
- 5 p m Faulkner Hospital clinicopathological conference
- \*8 15 p m Trudeau Society Beth Israel Hospital

## FRIDAY FEBRUARY 3

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Epidemiological Aspects of Tuberculosis Dr A S Pope
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Clinical meeting of the Children's Medical Service Massachusetts General Hospital Ether Dome

## SATURDAY FEBRUARY 4

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY FEBRUARY 5

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Diseases of the Heart and Their Management Dr William H Robey
- 4 p m Free public lecture, Harvard Medical School amphitheater of Building D Health and Hygiene During Pregnancy (for women only) Dr Harold M Teel

Open to the medical profession

JANUARY 27 — Massachusetts Psychiatric Society Page 125 issue of January 19

JANUARY 29 — Lecture at the Faulkner Hospital Page 971 issue of December 15

JANUARY 29 — Free Public Lecture, Harvard Medical School Page 1056 issue of December 29

JANUARY 29 — Beverly Hospital Public Health Lecture Page 1056 issue of December 29

JANUARY 29 — Salem Hospital Public Health Lecture Page 126 issue of January 19

JANUARY 31 — Massachusetts General Hospital Hospital Research Council Page 173

JANUARY 31 FEBRUARY 28 — Joseph H Pratt Diagnostic Hospital Medical Conference Program. Page 172.

FEBRUARY 1 28 — Consultation Clinics for Crippled Children in Massachusetts Under the Provisions of the Social Security Act Page 173

FEBRUARY 2 — Medical Clinic at the Peter Bent Brigham Hospital Page 173

FEBRUARY 2 — Faulkner Hospital Clinicopathological Conference. Page 173

FEBRUARY 2 — Trudeau Society Page 173

FEBRUARY 7 — Lawrence Cancer Clinic Page 173

FEBRUARY 4 MAY 15 and 16 — American Board of Obstetrics and Gynecology Page 451 issue of September 22 (Application for admission to Group A examinations must be on file in the Secretary's office by March 15 instead of April 1 as previously stated)

FEBRUARY 7 — Robert B Brigham Hospital Page 125 issue of January 19

FEBRUARY 9 — Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill.

FEBRUARY 22 — Alumni Day New York University College of Medicine Page 173

MARCH 13 — Fourth Annual Postgraduate Institute. Page 938 issue of December 8

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6 — American Board of Ophthalmology Page 126 issue of January 19

MARCH 27 31 — American College of Physicians Page 36 issue of July 7

MAY 7 15 — International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 15-16 — American Board of Obstetrics and Gynecology Inc Page 937 issue of December 8

MAY 15-19 — American Medical Association St. Louis, Missouri.

JUNE 6 7 8 — Massachusetts Medical Society Worcester

JUNE 12 17 — Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29 — National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER — Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11 15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28 — Pan Pacific Surgical Association Page 863 issue of November 24

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

FEBRUARY 8 — Essex Sanatorium Middleton Clinic at 5 p m Dinner at 7 p m Speaker Dr Edward Churchill Subject Surgical Treatment of Pulmonary Suppuration.

MARCH 1 — Lynn Hospital Clinic at 5 p m Dinner at 7 p m. Speaker Dr John Rock. Subject, Endocrinology

APRIL 5 — Addison Gilbert Hospital Gloucester Clinic at 5 p m. Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject, Allergy

MAY 10 — Annual meeting Salem Country Club Peabody

## NORFOLK

JANUARY 31 — Page 126 issue of January 19

## SUFFOLK

JANUARY 25 — Symposium on Diabetes Page 125 issue of January 19

MARCH 29 — Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced

APRIL 26 — Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced.

## WORCESTER

FEBRUARY 8 — Page 173

MARCH 8 — Worcester Memorial Hospital

APRIL 12 — Worcester Hahnemann Hospital

MAY 10 — Worcester Country Club — Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6 30 p m which is followed at 7 30 p m. by the business and scientific sessions

## BOOK REVIEWS

*Diseases of the Skin* A manual for students and practitioners Robert W MacKenna. Revised and enlarged by Robert M. B MacKenna. Fourth edition. 557 pp Baltimore William Wood & Co, 1937 \$7.00

This book represents the best British practice of today. Stress is laid on the diagnosis and the detailed treatment of the common dermatoses. The more unusual conditions are discussed in small type and quite briefly. The many formulas are of interest because they represent the English experience of the author and his father over many years. The book is well arranged, with an attempt to discuss cutaneous diseases under an etiologic classification so far as possible. The chapters on diseases due to fungi and the animal parasites are especially well handled, but there is little mention of the late evidence of syphilis of the central nervous system and the circulatory system. There are 168 black and white illustrations and 46 colored plates which add much to the excellence of the book.

*Aids to Biochemistry* E. A Cooper and S D Nicholas Second edition 213 pp Baltimore William Wood & Co, 1938 \$1.50

This is a very comprehensive little book, and is presented primarily for the purpose of review study. It is simple and clear, and quite informative. Methods are presented which are quite satisfactory. The book is recommended for general reading and as an aid to laboratory methods.



*Case 5* C P, a 65 year-old woman, complained in early December, 1935, of weakness and easy fatigability. The previous June she had had a short attack of fever of uncertain origin, accompanied by a moderate lymphocytosis and an enlarged and tender lymph node in the left axilla. From this indefinite illness she had recovered rapidly and completely. In December, she complained of weakness and was found to be running a septic type of temperature ranging at night from 99 to 102°F. Her appetite was poor. On one occasion she vomited a little blood. A few days later she passed a small amount of dark blood by rectum. Physical examination was essentially normal except for a moderate degree of loss of weight, some tenderness low in the left flank and a distended abdomen. There was no lymphadenopathy, neither the spleen nor liver was palpable. The lungs were clear and the heart appeared normal. The red-cell count was 4,210,000 and the white-cell count 10,200, with 11 per cent mature polymorphonuclear neutrophils, 22 per cent immature polymorphonuclear neutrophils, 13 per cent metamyelocytes, 10 per cent myelocytes, 36 per cent lymphocytes and 8 per cent monocytes. The platelets were present in normal numbers. It was suspected that the patient had some obscure infection or a carcinoma of the gastrointestinal tract. She gradually failed without developing any specific or localizing symptoms or signs and died December 27. Autopsy revealed the classical picture of aleukemic myelosis—namely a replacement of the normal marrow elements by stem cells and myeloblasts. There was no leukemic infiltration of the liver, spleen or lymph nodes. During life one could not properly have diagnosed leukemia. Yet the patient died of that disease (or at least one closely allied to it) within 4 weeks from the onset of symptoms.

The diagnostic difficulties become still greater when some other specific disease is more or less closely simulated or when the presenting symptom is such that one's attention is distracted from the underlying blood dyscrasia.

*Case 6* C. C., an 8-year-old girl, complained in June, 1932, of migratory joint pains in the ankles, wrists and elbows. She was found to be running a slight, irregular temperature. The involved joints were swollen, tender and very painful on active or passive motion. There was a soft systolic apical murmur. Otherwise the physical examination was normal. A diagnosis of rheumatic fever was made, and under salicylate therapy the patient improved rapidly, she remained apparently well until August of the same year, when there was a recrudescence of the joint pains and marked loss of weight and strength. The red-cell count was 2,300,000, the hemoglobin 50 per cent, and the white-cell count 400, with 2 per cent polymorphonuclear neutrophils and 98 per cent lymphocytes. The platelets were normal in number. Several blood transfusions were given and the red-cell count rose to 5,000,000 and the white-cell count to 7000, with 66 per cent polymorphonuclear neutrophils, 33 per cent lymphocytes and 1 per cent monocytes. The arthritic pains, however, continued unabated and the child failed rapidly. From the end of August occasional myelocytes and stem cells appeared from time to time in the blood smears, and the platelets fell progressively reaching 20,000 per cubic millimeter on October 10. An x-ray taken shortly thereafter showed fine mottling of the cranial bones and of the pelvis. In addition the long bones showed generalized absorption, most marked at the ends, giving the appearance of rotten wood. On the basis of the clinical

picture together with the x-ray findings, the presence of thrombopenia and occasional very immature white cells in the blood smear, a diagnosis of leukemia was made, it was confirmed by bone marrow biopsy. From then on more and more stem cells appeared in the blood stream, and by January 26, 1933, the red-cell count had fallen to 1,500,000. The white-cell count was 700, with 24 per cent mature polymorphonuclear neutrophils, 2 per cent young polymorphonuclear neutrophils, 6 per cent myelocytes, 40 per cent stem cells and 28 per cent lymphocytes. The patient died shortly thereafter. The diagnosis had for several months been very much in doubt and leukemia was not seriously considered until comparatively late in her disease. Yet there can be but little doubt that it was already well advanced when medical care was first sought, and that the initial "arthritic pains" were in reality due to the same leukemic destruction of the bones that became so prominent a feature of the later illness.

"Arthritic pains" are a not uncommon complaint in children with acute leukemia,<sup>3, 4</sup> in adults they are rarely encountered. The x-ray picture is very characteristic, presenting as it does a moth-eaten or mottled appearance, particularly at the ends of the long bones, periosteal elevation is common, and in conjunction with an abnormal blood in which are found myelocytes and stem cells, be they ever so few in number, the diagnosis of leukemia can be made with some confidence.

Occasionally acute leukemia may start with the signs and symptoms of an acute abdominal emergency.

*Case 7* T F, a 4-year-old boy, was awakened early one morning by severe pain in the right lower quadrant. His doctor found marked tenderness and spasm at McBurney's point, a moderate elevation of temperature and a white-cell count of 18,000. A tentative diagnosis of appendicitis was naturally made and operation was deemed necessary. At the hospital the differential white-cell count showed practically 100 per cent stem cells. Nevertheless, the boy was operated on and the appendix was found to be infiltrated by leukemic cells. Immediate convalescence was uneventful and the patient was discharged on the 10th hospital day, but anemia, hepatomegaly and splenomegaly rapidly developed and he died 2 months after the apparent onset of his condition. He had entered the hospital with an entirely justifiable diagnosis of acute appendicitis, with all the prognostic implications of that condition. He left 10 days later doomed to certain death.

*Case 8* R. M., a robust and active man of 51, was seized with extreme pain in the lower abdomen and presented all the signs of complete intestinal obstruction. There was no fever. He was immediately operated on, but no obstruction was found. Both liver and spleen were moderately enlarged. There was no lymphadenopathy. Post-operatively, the red-cell count was 5,200,000, the hemoglobin 102 per cent and the white-cell count 1000, with 100 per cent stem cells. The platelets were greatly reduced. The patient developed a moderate degree of fever and slight jaundice. There was pronounced enlargement of the salivary glands and lymph nodes in the neck. For a few days there was rapid improvement and the white-cell count rose to 21,000, with a practically normal differential count. Equally rapidly, however, the immature cells reappeared, and 6 days after entry stem cells consti-

nosis The patient, F C, a forty-eight-year-old man, was found on routine examination in 1911 to have a white-cell count of 232,000, with 93 per cent mature lymphocytes The red-cell count and hemoglobin were normal He had very mild diabetes, but presented no symptoms suggestive of leukemia It is impossible to say how long his blood condition had already existed before it was discovered No specific therapy was instituted The patient continued to show the characteristic signs and the hematologic picture of lymphatic leukemia, but remained essentially symptom-free until 1926, when he began to lose weight and suffer from intractable diarrhea It was correctly surmised that these symptoms were traceable to his fundamental blood disorder X-ray therapy promptly relieved the diarrhea and greatly improved the general condition At about the same time, however, he began to complain of angina pectoris Gradually his heart condition became worse and he died in 1935 of coronary thrombosis, twenty-four years after his leukemia had been discovered Autopsy revealed the characteristic leukemic infiltration of the liver, spleen, lymph nodes and bone marrow

It may be argued that these patients did not, in actuality, have lymphatic leukemia, that their life span was inconsistent with such a diagnosis Yet it must be admitted that throughout life they showed the signs, symptoms and laboratory findings usually considered diagnostic of that condition, furthermore, in the case just described, post-mortem examination revealed the essential findings of that disease with splenomegaly, hepatomegaly and generalized leukemic infiltration of the bone marrow

From time to time, therefore, one encounters patients who by all known criteria appear to have the disease we call leukemia, but who, for reasons as yet unknown, live in comparative comfort far beyond the usual duration of this condition Such patients are usually relatively symptom-free early in the course of their illness, and not infrequently physical examination reveals few abnormalities Most commonly these cases have lymphatic leukemia, much more rarely myelogenous leukemia So far as our experience goes, monocytic leukemia is never of long duration

Unfortunately we may also err in our prognosis in the opposite direction Leukemic patients apparently in good condition may be struck down suddenly and death may ensue rapidly when but a short time before one would have said, and with some justification, that the immediate outlook was good We do not refer to a rapidly fatal outcome due to other pathologic conditions, but to that directly traceable to the leukemic state

*Case 3* N S, a 30-year-old woman had been known to have myelogenous leukemia for over a year Under x ray therapy her initial symptoms,—abdominal distress after meals and weakness,—had abated and her white cell count, previously 150,000, had fallen to 12,200 The differential at various times had shown from 20 to 40 per cent myelocytes The red-cell count had fluctuated between 4,500,000 and 5,000,000 The platelets had gradually diminished from normal to approximately 80,000 per cubic millimeter The patient's general condition, however, seemed excellent, and she was able to carry on an active career provided she rested for an hour or so after lunch each day There was no anemia or lymphadenopathy, and the spleen was just palpable on inspiration One morning she complained of vertigo, extreme weakness and chilliness Physical examination revealed a very apprehensive woman with a pulse of 160, respirations of 40 and a temperature of 105°F The lungs were clear The peripheral blood picture did not differ materially from that which had obtained during the previous months She was slightly disoriented and so dizzy that she was unable even to sit up in bed She became increasingly incoherent, disoriented and drowsy and died the next morning, presumably from a massive cerebral hemorrhage, possibly of the intraventricular type There is every reason to believe that the hemorrhage was directly due to the leukemia.

*Case 4* L W, a 49 year-old man, entered the hospital complaining of slight weakness of 1 month's duration and a mass in the abdomen Physical examination revealed a spleen which reached to the level of the umbilicus, and the patient proved to have myelogenous leukemia, with a white-cell count of 27,000 and a differential count of 40 per cent mature polymorphonuclear neutrophils, 16 per cent metamyelocytes and 20 per cent myelocytes The red-cell count was 3,800,000 and the platelets were considerably reduced in number The general condition was good and the prognosis was considered favorable, chiefly on account of the comparatively small percentage of immature white cells in the blood and the paucity of the symptoms On the 3rd day, before receiving any x ray therapy, the patient passed a large amount of blood by rectum and died a few hours later Autopsy revealed the characteristic findings of myelogenous leukemia and no cause of death other than the massive intestinal hemorrhage, probably dependent on the hemorrhagic diathesis incident to leukemia

In all instances the patient's family should be advised of the fact that sudden death may occur even though the patient seems to be progressing satisfactorily

The acute leukemias frequently present greater diagnostic problems than do the chronic forms The usual picture of weakness, fever, moderately elevated white-cell count, grossly abnormal differential count with many primitive cells of one series or another, progressive anemia and thrombocytopenia may be very incomplete or even entirely lacking early in the disease Any one of these features may fail to appear until comparatively late In short, the blood findings may reflect but poorly the underlying pathologic condition and unless one bears this fact constantly in mind, serious errors are liable to be made

and the red-cell count, which has been steadily falling, rises rapidly to a normal value. The platelets return and the patient appears to have recovered. After a period of one to five months all the signs and symptoms of acute leukemia suddenly reappear, and the patient dies in a comparatively short time.

Patients may present a peripheral blood picture indistinguishable from that of leukemia yet actually suffer from some entirely different disease, and occasionally one which does not run the fatal course of that condition. It is well known that in sepsis there is frequently a marked shift to the left in the white-cell picture. It is not so generally appreciated that the blood may be indistinguishable from that in leukemia.<sup>6</sup> In patients who are recovering from agranulocytosis and in whom considerable sepsis exists, one may find white-cell counts as high as 155,000, with myelocytes as high as 45 per cent. Under these circumstances it is easy to regard the initial illness as an atypical aleukemic leukemia, and to see in the subsequent elevated white-cell count and the grossly abnormal differential count positive evidence for the leukemic state with its inevitably fatal outcome. In 1 case after an acute agranulocytosis the temperature, which had become normal, started to rise again, the white-cell count rose to 33,000 and the differential count showed 42 per cent early myelocytes. Sepsis was suspected, but on account of the white-cell picture the physician in charge of the case insisted that the condition was leukemia. The patient died of a brain abscess secondary to an unrecognized orbital cellulitis, and postmortem examination failed to reveal any signs of leukemia. Aleukemic leukemia may also be simulated.

*Case 11* J G, a 45-year-old man, was admitted to the hospital July 17, 1937. For 1 week he had had symptoms consistent with a diagnosis of pneumonia—pain in the chest, fever, cough and blood streaked sputum. No blood examination had been made.

Physical examination on entry revealed a semicomatose man with a slight jaundice. There were indefinite signs of pneumonia at the right base. The liver was felt 4 cm below the costal margin. The spleen was easily palpable. The temperature was 104.4°F, the pulse 130 and respirations 28. The red-cell count was 4,000,000, the hemoglobin 75 per cent and the white-cell count 1000, with 23 per cent polymorphonuclear neutrophils, 19 per cent metamyelocytes, 33 per cent myelocytes, 14 per cent stem cells and 11 per cent lymphocytes. The platelets were markedly diminished. A diagnosis of myelogenous leukemia with complicating pneumonia was made. The patient died within 24 hours. Postmortem examination showed lobar pneumonia of the right lower lobe, alcoholic cirrhosis and a hyperplastic bone marrow. There was no evidence of leukemia.

These diagnostic difficulties are materially increased when one remembers that patients who

have had undoubted leukemia, as proved by blood studies and bone-marrow biopsy, may die shortly thereafter and at autopsy show not the slightest evidence of the disease.

*Case 12* J T H., a 68-year-old man, was admitted to the hospital on October 14, 1929, with the chief complaint of a mass in the left upper quadrant. In addition he had some pain in the region of the mass. Physical examination revealed the spleen descending to the level of the umbilicus and the liver could be felt 8 cm. below the ribs. Otherwise the examination was essentially normal. The red-cell count was 3,370,000, the hemoglobin was 68 per cent and the white-cell count was 275,000, with 50 per cent polymorphonuclear neutrophils, 42 per cent neutrophilic myelocytes, 3 per cent eosinophilic myelocytes and 5 per cent stem cells. The basal metabolic rate was +46 per cent. The patient was given x-ray therapy with a moderate drop in the white-cell count and a definite though not marked diminution in the size of the spleen. He gradually failed. One month after admission the red-cell count had fallen to 2,700,000, the hemoglobin to 50 per cent and the white-cell count to 5250. The differential had become essentially normal and the basal metabolic rate had dropped to +4 per cent. The patient died January 26, 1930. Postmortem examination failed to show any infiltration of the liver or spleen. In most places the vertebral bone marrow was completely fatty, and here and there could be seen small areas characteristic (in so far as the particular field was concerned) of leukemia. For the rest, all evidence of the disease had disappeared.

In this case there was no bone-marrow biopsy at entrance to prove the condition, but the elevated metabolism and the occasional leukemic patches in the marrow virtually prove that the patient did in fact have leukemia, and that that disease had given way to aplastic anemia. Mallory<sup>8</sup> reports an almost identical case in which a bone-marrow biopsy confirmed the leukemic infiltration occurring early in the course of the disease.

Many other pathologic states may give rise to blood pictures indistinguishable from that of leukemia.<sup>6</sup> We draw special attention to two, namely miliary tuberculosis and carcinoma.

*Case 13* F K, a 19-year-old man, entered the hospital with a history of weakness and fatigue for 2 months. The temperature was 104°F, the pulse 120, and the respirations 25. Physical examination showed very marked pallor of the mucous membranes and bean-sized lymph nodes in each side of the neck, each axilla and each groin. The spleen was easily palpable on deep inspiration. The red-cell count was 2,130,000, the hemoglobin 49 per cent and the white-cell count 6100, with 44 per cent polymorphonuclear neutrophils, 25 per cent myelocytes, 22 per cent myeloblasts, 8 per cent lymphocytes and 1 per cent monocytes. The platelet count was 187,000. The patient continued to run a septic temperature with occasional chills. Blood cultures were repeatedly negative. During the next 2 months he sustained numerous superficial skin abscesses and was regarded as having a subacute myelogenous leukemia with sepsis. The red-cell count fell to 1,900,000, the white-cell count to 2100, with 33 per cent myeloblasts and the platelet count to 46,000. The physical examination remained essentially as on admission. The patient died

tuted 87 per cent of the total white cells. At that time the spleen reached to the umbilicus. The patient died 8 days after his operation. Postmortem examination showed the characteristic findings of acute myelogenous leukemia with infiltration of the liver, spleen, kidneys, intestinal wall and bone marrow.

In the vast majority of instances, once the diagnosis of acute leukemia is established the patient grows steadily worse and responds but little to any therapeutic measure. Occasionally the condition progresses by a series of minor remissions and relapses without there being at any time any question of the correctness of the original diagnosis. In rare cases there occur frank remissions of considerable duration, during which few if any features of leukemia are present and in which the patient returns to apparently excellent health, and unless this fact be borne in mind, serious errors may be made.<sup>5</sup> The original diagnosis may be doubted or even discarded and both the doctor and the family may be lulled into a false sense of security which is in no way justified by the subsequent course.

*Case 9* J. R., a 35-year-old butcher, entered the hospital November 9, 1929. A week before entry he had become very weak and had profuse bleeding from the gums. Fever was noted from the onset. The day before entry a small quantity of fresh blood was passed by rectum. Physical examination showed a pale, prostrated man with greatly swollen and bleeding gums. There were many bean-sized lymph nodes in each side of the neck. The spleen reached to the level of the umbilicus. In the lower rectum could be felt an exquisitely tender mass which bled freely on gentle palpation. The temperature was 100°F. On the day of admission, his red-cell count was 3,120,000 and the hemoglobin 70 per cent. The white-cell count was 11,000, with 90 per cent stem cells, 4 per cent polymorphonuclear neutrophils and 6 per cent lymphocytes. No platelets were seen in the smear. Two days later petechiae appeared in profusion over the neck, shoulders and chest. The temperature rose to 105°F and the patient seemed moribund. The white-cell count fell to 2800, with the differential count essentially unchanged. Within the next few days, however, the count rose precipitately and the differential white count steadily approached normal, the stem cells being gradually replaced first by myelocytes, then by metamyelocytes and finally by mature polymorphonuclear neutrophils. The platelets increased rapidly. The patient gained in strength, the temperature fell to normal, the bleeding ceased, the spleen receded to normal size and the enlargement of the cervical lymph nodes completely disappeared. By December 18, 1 month after entry, the white-cell picture was entirely normal, blood platelets were present in the usual number and the general condition was excellent. The red cell count gradually rose to 5,000,000. During January, February, March and April, the patient was perfectly well in all respects. The physical examination was normal and no abnormalities could be detected in his peripheral blood. No trace of the fulminating disease from which he had suffered in November remained. Suddenly in late April, he was seized with a severe headache. Once more he was found to have the characteristic blood picture of acute leukemia (only 3 days previously the blood smear had been entirely normal) and he died May 5, 5½ months from

onset, after a complete remission of nearly 5 months. A bone marrow biopsy shortly before death revealed the characteristic histologic picture of acute myelogenous leukemia.

What caused the remission? What relation had the first illness to the second? Was the patient temporarily cured of his leukemia, or was it merely that the outward and visible signs of the disease were no longer manifest? These questions cannot at present be answered. But we do know that such remissions occur, and it is obvious that their appearance may cause great confusion, particularly if in the first attack there has been any doubt regarding the diagnosis, we have already seen that in the initial stages of acute leukemia the signs and symptoms may be far from pathognomonic.

*Case 10* N. B., a 5 year-old girl, became ill in November, 1932. She ran a septic temperature reaching to 102°F and became rapidly weaker. The red-cell count on admission to the hospital was 2,000,000. The hemoglobin was 36 per cent and the white-cell count was 13,000, with 9 per cent polymorphonuclear neutrophils, 86 per cent lymphocytes and 5 per cent myelocytes. After 1 month she contracted measles and developed bilateral otitis media and necrosis of the lower lip. The white-cell count fell to 1000 and the differential white-blood count showed 91 per cent immature lymphocytes. The platelet count dropped to 10,000 and the red-cell count fell to 1,200,000. After several blood transfusions and intensive Pentnucleotide therapy the white-cell count rose to 10,200 with a normal differential count, and the red-cell count rose to 4,200,000 early in January, 6 weeks after the initial symptoms. In the meantime the temperature fell to normal, the otitis cleared up and the patient's strength completely returned. She remained entirely well both from a clinical and hematological point of view until May 16, 1933, when she developed bilateral mastoiditis, with a temperature of 105°F. In addition she had generalized joint pains, and x-ray studies revealed the characteristic picture of leukemic infiltration of the bones, just as in Case 6. The red-cell count was 1,800,000 and the white-cell count 23,000, with 97 per cent immature lymphocytes. During the next 6 weeks the patient failed rapidly, and she died in mid July, 8 months after her first illness and 10 weeks after the termination of the 5 month remission. Postmortem examination showed the characteristic features of acute lymphatic leukemia.

Here again we have an example of a dramatic remission after an illness which had all the hallmarks of acute leukemia. As has been said, we are ignorant of the cause of these remissions, but it is important to recognize that they may occasionally occur. In our experience, they usually follow a definite pattern. After a stormy onset, the elevated white-cell count falls rapidly to well below normal, then as rapidly rises once more. The immature white blood cells, initially present in large numbers, become less and less. With the rising white-cell count the differential count becomes steadily more normal. During this time the patient's general condition improves rapidly.

opsy showed that in this region at least the normal elements had been completely replaced by fibrous tissue.

During the ensuing months the red-cell count gradually fell to normal, and it remained at that level from September, 1933, to June, 1938. The hemoglobin dropped gradually from 110 per cent on December 9, 1931, to 52 per cent in June, 1938. The white-cell count fluctuated between 9000 and 28,000, and at all times the differential count showed a definite and increasing percentage of immature cells of the granulocyte series. During 1931 and 1932 the polymorphonuclear neutrophils had varied from 69 to 89 per cent and the myelocytes from 1 to 10 per cent. Basophils were constantly present, and varied between 2 and 5 per cent. By 1934 there were almost constantly present more than 12 per cent myelocytes, and a few nucleated red-blood cells were seen from time to time.

Early in 1938, when the red-cell count had dropped to 3,460,000 and the hemoglobin to 49 per cent, the white-cell count was 18,750 and the differential count showed 42 per cent polymorphonuclear neutrophils, 25 per cent myelocytes, 5 per cent stem cells, 10 per cent basophils and 18 per cent lymphocytes. Seventeen nucleated red cells were seen while counting 100 white cells. The platelet count was 180,000. The blood picture was essentially that of an early myelogenous leukemia. At this time the patient was definitely weaker than ever before. She had lost much weight, the liver reached nearly to the umbilicus and the spleen nearly to the iliac crest.

The basal metabolic rate was +20 per cent, a rate entirely consistent with the degree of myeloid metaplasia which the patient was assumed to have, but rather lower than that

which would probably have obtained in chronic leukemia of this duration and activity.

A second bone marrow puncture was done, and again it showed merely fibrosis of the marrow. In view of the long, relatively asymptomatic course, the initial polycythemia and the bone marrow findings, one must conclude that the condition was one of myeloid metaplasia rather than myelogenous leukemia, as was originally suspected.

#### CONCLUSION

It is apparent from a consideration of these cases that the course of the various leukemias may deviate sharply from the classic one, on the other hand, various other pathologic conditions—some of them curable—may give rise to a blood picture indistinguishable from that seen in this disease.

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## HYPERHIDROSIS OF NERVOUS ORIGIN AND ITS TREATMENT BY SYMPATHECTOMY\*

JAMES C. WHITE, M.D.†

BOSTON

**L**IST and Peet,<sup>1</sup> in their excellent articles on the activity of the sweat glands, have shown that these structures respond both to thermal and to psychic stimuli. While heat sweating is a generalized process and is rarely a cause for complaint, hyperhidrosis of nervous origin may become extremely annoying and even incapacitating. The latter variety is usually limited to the palmar and plantar surfaces and to the fingers and toes. Above the wrists and ankles perspiration is normal (Fig 1). The clamminess of hands and feet may be really disabling. Beads of perspiration may form on the fingertips and wet everything the patient handles. Shaking hands may become most embarrassing, as one of my patients, a lawyer, complained "The law is a handshaking profession and I can't do it!" Another patient, a medical student, could not assist at operations

because the sweat ran over the tops of his rubber gloves. The feet commonly perspire to a similar extent, so that the lower part of the sock or stocking is dripping wet. The feet of one of Telford's<sup>2</sup> patients sweat so excessively that he was forced to take off his boots and empty them of water several times a day. Excellent photographs of the excessive degree of sweating which may be seen in this condition are to be found in an article by Adson, Craig, and Brown.<sup>3</sup>

This type of hyperhidrosis is usually accompanied by some degree of vasospasm, so that the sweaty extremities are frequently cold and at times cyanotic. As patients with Raynaud's disease often have extremely moist, as well as cold, extremities, the two conditions seem to shade imperceptibly one into the other. Unlike Raynaud's disease, hyperhidrosis is frequently seen in men, but both diseases are likely to occur in young and emotionally unstable individuals. Dickens<sup>4</sup> must have been acquainted with such a case to have written his classic description of Uriah Heep: "It

\*Read at the annual meeting of the New England Surgical Society, Boston, October 1, 1938.

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5 months from the onset of his illness, and postmortem examination showed widespread miliary tuberculosis of the lungs, pleura, lymph nodes, spleen, liver and bone marrow. There was no evidence of leukemia.

In certain cases carcinoma may give rise to a blood picture closely simulating leukemia—and this without necrosis, infection or fever.

*Case 14* M. M., a 70-year-old woman, was admitted to the hospital with a story of cough and increasing weakness for 4 months. In addition she had been losing weight rapidly. Her past history was essentially normal except that for 10 years she said she had "glands" in her neck.

Physical examination showed a frail, elderly woman. The thyroid was definitely enlarged, nodular and firm. The liver was palpable 4 cm. below the costal margin. Otherwise there were no notable abnormalities. The temperature was normal, the respirations were 30 to 35 and the pulse was 110 to 130. On entrance the red-cell count was 4,300,000, the hemoglobin 85 per cent and the white-cell count 76,000, with 85 per cent polymorphonuclear neutrophils, 12 per cent myelocytes, 2 per cent lymphocytes and 1 per cent monocytes. The platelets were diminished in number. During the next few days, the white-cell count rose to 180,000, with increasing numbers of early myelocytes, and the patient died on the 4th day. At no time did her temperature rise above normal. Postmortem examination showed slight bronchopneumonia, colloid adenoma of the thyroid and a large mediastinal carcinoma with metastases to the liver and spleen. The bone marrow showed increased activity in both red-cell and white-cell series but no leukemic infiltration.

The following case was still more striking.

*Case 15\** I. R., a 45-year-old carpenter, developed a cough and pain in the chest 6 weeks before admission to the hospital. Physical examination on entrance was essentially normal except for slight dullness at the right apex of the lung, associated with increased tactile fremitus and slight dullness in the right lower axilla. The red-cell count was 4,300,000, the hemoglobin 80 per cent and the white-cell count 51,250, with 85 per cent polymorphonuclear neutrophils, 11 per cent lymphocytes, 2 per cent monocytes, 1 per cent eosinophils and 1 per cent basophils. The patient's temperature fluctuated between 98 and 100°F. Two weeks later the patient experienced a sudden, sharp, severe pain in the left axillary region and immediately coughed up a large amount of foul, blood tinged sputum. Although the red-cell count remained normal the white-cell count rose to 116,000, with 93 per cent polymorphonuclear neutrophils, many of which were band forms. A lateral chest film showed an oval area of consolidation in the central part of the right lung field. The cough, sputum and fever continued and the patient gradually failed and died 2 months after his initial symptoms. Postmortem examination showed a carcinoma of the right lung with metastases to the regional lymph nodes, liver, pancreas, adrenals and kidney. The bone marrow was so hyperplastic as to resemble superficially that seen in leukemia. But the percentage of immature granulocytes in the marrow was no greater than normal, the hyperplasia was patchy rather than diffuse and there was no leukemic infiltration in the liver, spleen or lymph nodes.

The method by which such gross hyperplasia is produced in the presence of carcinoma (especially

of the lung and of the liver, it would seem) is uncertain, but the fact remains that malignant disease may produce a leukemoid blood picture and, as in the case just cited, may result in a degree of bone-marrow hyperplasia superficially resembling that seen in leukemia.

Finally, we wish to refer to that pathologic state which for lack of a better term is now called myeloid metaplasia, a condition which closely simulates leukemia both from a clinical and a hematological point of view, but which runs a more benign course. Its etiology and indeed its pathogenesis is obscure. It would seem probable, however, that for a variety of reasons—abnormal blood supply to the bone marrow, fibrosis of the marrow, osteosclerosis or the like—the normally active and efficient hematopoietic tissues are no longer able to carry on their allotted function and the normally fatty marrow of the femur and tibia, together with the potentially hematopoietic organs such as the liver and spleen, must perforce take over the task of producing the blood cells so necessary for the bodily economy. That these newly called upon tissues are but poor successors to the "red marrow" is attested by the peripheral blood picture, which is, as has been said, leukemoid in type.

*Case 16* L. J., a 51 year-old married woman, entered the hospital on September 28, 1931. Twenty five years previously she had had a severe attack of jaundice with headache, nausea, vomiting and vertigo. Since that time she had had three similar attacks, the last one in 1923. In 1926 an abscessed tooth was removed and there followed profuse bleeding for 24 hours. A few weeks after this episode there was a massive hemorrhage from the mouth and much blood was found in the stools. An abdominal exploration was performed and a gastric ulcer was said to have been found, although the evidence on this point is not entirely clear. In 1929, the patient's tongue became sore and she lost considerable weight. During the next few years she felt below par, her appetite was poor and she continued to lose weight. Physical examination on entry showed an atrophic tongue, slight pallor of the mucous membrane and a spleen extending 4 cm. below the ribs. Otherwise there were no noteworthy abnormalities. There was no free hydrochloric acid in the stomach, even after histamine. The red-cell count was 5,390,000, the hemoglobin 57 per cent and the white-cell count 28,500, with 70 per cent polymorphonuclear neutrophils, 9 per cent myelocytes, 11 per cent lymphocytes, 3 per cent monocytes, 4 per cent eosinophils and 3 per cent basophils. The platelets were not only unusually large but greatly increased in number. The reticulocytes were 2.8 per cent, the icteric index 7.0 and the fragility of the red cells normal. A tentative diagnosis of early myelogenous leukemia was made and the patient was given iron by mouth. Within 1 month the red-cell count had risen to 7,000,000 and the hemoglobin to 68 per cent. The patient felt well, but several ecchymoses appeared on each thigh. During the next 6 months the condition remained essentially unaltered and the red-cell count at 7,000,000 or slightly above. In March, 1933, a sternal bone marrow bi-

\*I am indebted to Dr. Tracy B. Mallory of the Massachusetts General Hospital for permission to cite this case.

of the operations reported below make it extremely unlikely that any originate above the second thoracic nerve in man. After reaching the paravertebral sympathetic trunk, all these preganglionic axones run upward to the lowest cervical and upper two thoracic ganglia, where they establish synapses with postganglionic neurone cells whose axones are distributed to the cords of the brachial plexus over the gray rami communicantes (Fig 2)

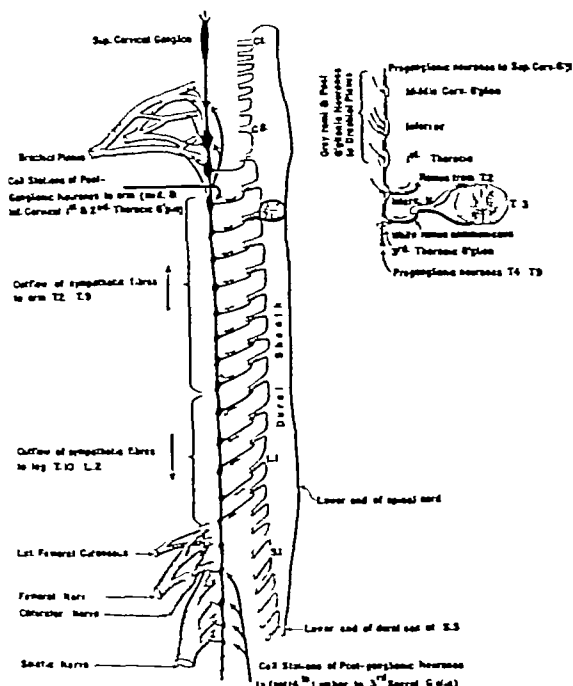


Figure 2 *The Anatomic Arrangement of the Sympathetic Fibers to the Arm and Leg*

The nerve supply to the sweat glands of the foot leaves the cord over the lowest thoracic and upper two lumbar nerves, and is distributed to the roots of the sciatic nerve from the fourth lumbar to third sacral ganglion.

Neurosurgical relief of extreme hyperhidrosis of the extremities has been called to the attention of the medical profession through the reports of Braeucker,<sup>10</sup> Pieri,<sup>15</sup> Leriche and Frierh<sup>16</sup> and Roberts,<sup>1</sup> and the more recent article by Adson, Craig and Brown<sup>4</sup> in this country. In the Massachusetts General Hospital the operation was first performed in 1932.<sup>15</sup> Standardized procedures are now available to sever the sympathetic fibers running to the upper and lower extremities. As the vasomotor and pilomotor fibers are mixed with the sudomotor ones, the operation diminishes vasoconstrictor tone, in addition to causing a total paralysis of sweating and of pilomotor activity. In the case of the lower extremities, resection of the second and third lumbar ganglia can be count-

ed on to stop all sweating below the knees, as well as to produce a lasting vasodilatation. In the case of the arm the sympathetic pathway may be interrupted in its postganglionic portion by cervicothoracic ganglionectomy as proposed by Adson.<sup>19</sup> This results in a Horner's sign (drooping of the upper lid, pupillary constriction and enophthalmos), which is somewhat disfiguring, particularly when the operation is done on only one side. Recent investigation<sup>18, 20</sup> has shown that degeneration of the sympathetic fibers leaves some residual vasoconstrictor tone from the direct action of adrenaline and sympathin on the arterial walls, which become hypersensitive to these chemical mediators after the nerve fibers have degenerated. It is a well-known physiological fact that this chemical sensitization is more accentuated if the peripheral sympathetic pathway is interrupted in its postganglionic rather than in its preganglionic portion. This action of the sympathomimetic hormones does not affect the sweat glands in any way, as they respond only to the chemical action of acetylcholine,<sup>21</sup> but it is of considerable importance to avoid its action on the vascular tree in persons who already exhibit a tendency to abnormal vasoconstrictor activity. A method of denervation which does not produce a Horner's syndrome and causes only a minimal sensitization of the smooth muscle of the vascular walls has been developed by Smithwick<sup>22</sup> and by Telford.<sup>23</sup> In order to interrupt only preganglionic axones to the upper extremity, the inferior cervical and first and second thoracic ganglia are spared, but the sympathetic chain is cut at the level of its third ganglion and all higher connections with the second and third thoracic roots are severed. The details of these operative methods are beyond the scope of this article, but as success depends on a most exact technic, each step outlined in the original description must be followed with care.

It will be noted in the case histories below that hyperhidrosis in the hands was relieved in 1 case by paravertebral infiltration of alcohol around the first and second thoracic ganglia, with only a single night's hospitalization and without any interruption of the patient's employment. A second equally successful result has been obtained by Freeman.<sup>24</sup> Nevertheless it is my belief that with rare exceptions surgical denervation is the better procedure, as its action is certain and the operative risk is almost nil in this group of young and otherwise healthy individuals. After alcohol block there is considerable risk of incomplete results and some risk of producing a troublesome intercostal neuritis.

Certain precautions should be observed in performing these operations. As stated above, a dis-

was no fancy of mine about his hands, I observed, for he frequently ground the palms against each other as if to squeeze them dry and warm, besides often wiping them, in a stealthy way, on his pocket handkerchief"

#### ETIOLOGY

No specific etiologic factor is known for this form of hyperhidrosis, but it is brought about by

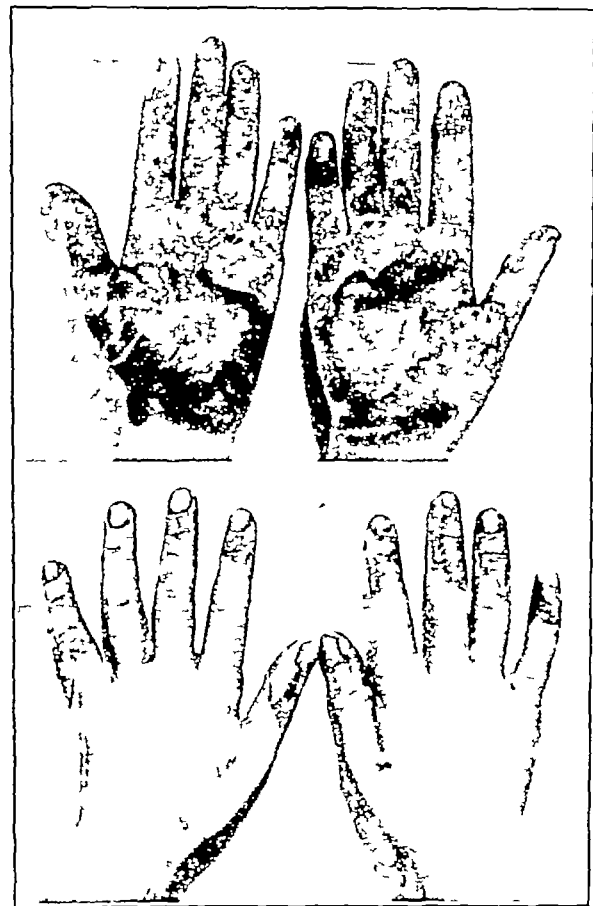


Figure 1 Photographs of the Hands of a Patient (Case 1) with Hyperhidrosis of Nervous Origin

They illustrate the characteristic areas of sweating. Sweat secretion is brought out in black by Minor's starch-iodine method

hyperactivity of the sympathetic nervous system and is exaggerated by nervousness. Just as generalized sweating is frequently seen in high-strung thoroughbred horses in the paddock before a race, in human beings the more localized variety of nervous sweating can be brought out by any difficult mental problem or embarrassing situation. When the normal individual is terrified and breaks out in "a cold sweat," it is the hands and feet that are usually involved. As a result of recent investigations on the role of the premotor

cortex and the autonomic centers in the hypothalamus, it is now known that all forms of visceral activity may be influenced by the psychic state of the individual.<sup>6</sup> Cobb,<sup>7</sup> who is making a psychiatric examination of patients with abnormal vasomotor and sudomotor activity, has reached the conclusion that these individuals have a special psychological make-up which, as he puts it, "is characterized by inner emotional turmoil thoroughly covered and repressed beneath a pleasant but formal appearance and superficially co-operative behavior." It is therefore not a far-fetched hypothesis to assume that the cause of these conditions will be found to lie in the corticodiencephalic mechanisms which control our emotional status.

#### TREATMENT

In the treatment of severe hyperhidrosis medical measures have been unsatisfactory. Application of antisudorific preparations, such as 5 per cent formalin, bring about some local reduction in sweating, but at the expense of maceration and irritation of the skin. Radiation of the skin may cause some atrophy of the glands, but it must be pushed to the point of risking a chronic dermatitis. As spontaneous activity of the sweat glands is mediated by the sympathetic nerves, it ceases entirely when these pathways are interrupted. Charts showing the areas of anhidrosis after various operations on the sympathetic nervous system have been published by Roth.<sup>8</sup>

Sympathectomy was first carried out to reduce hyperhidrosis by Kotzareff<sup>9</sup> in 1919. In this operation the resection included only the cervical ganglia, but the excessive sweating appears to have stopped. The anatomical and surgical aspects of this condition were thoroughly explored by Braeucker<sup>10</sup> and by Hesse<sup>11</sup>. The former stated that the sympathetic sudomotor axones to the hand run over the rami communicantes of the two lowest cervical and the first thoracic ganglia. Hesse<sup>11</sup> and his colleague Juzelevskij, however, found that some additional lower fibers leave the second thoracic ganglion, and this has been confirmed by Kuntz.<sup>12</sup> According to Langley<sup>13</sup> and Braeucker,<sup>10</sup> these fibers leave the spinal cord in the motor roots from the fourth to the ninth thoracic segments. Recent observations of Kuntz, Alexander and Furcolo<sup>14</sup> demonstrate that there are higher fibers which emerge over the second and third intercostal nerves, and that a few fibers to the sweat glands in the cat's paw run in the first thoracic root. Clinical experience has shown that sudomotor axones leave the cord as high as in the second and third thoracic roots, but the results



*Case 3* L L, aged 23 This patient, also a medical student, had noticed excessive sweating of the hands and feet for 13 years This had recently increased to an incapacitating degree. Treatment with formalin and x ray had been ineffective. Otherwise he had always been in excellent health He showed marked sweating of the hands, with a sharp line of demarkation at the wrists Beads of moisture stood out on his palms and the soles of his feet and frequently dropped off. The extremities were cold as well as wet to the touch. The patient admitted that he had been 'nervous' as long as he could remember

On August 21, 1936, a right preganglionic sympathectomy was performed. Sweating tests performed on discharge showed no trace of perspiration above the second rib on the right side. The patient returned to medical school 1 month later and had no further trouble with perspiration in his right hand (Fig 4) Nine months later



Figure 4 Photograph of the Hands of a Patient (Case 3) Nine Months after Right Thoracic Sympathectomy

*The right palm remains completely dry, the left is dripping wet*

he returned for operation on the left side. After each operation he made a smooth and uneventful convalescence.

A follow up letter 3 months after the second operation stated that the left hand had remained completely dry and warm. The right hand showed a trace of perspiration along the medial side of the palm. This was too slight to be of any concern, and the remaining area of the right arm, and all the left arm, as well as the head and neck, remained completely dry. The patient was in excellent condition and felt better both mentally and physically.

*Case 4* C J, aged 29 The patient, who did secretarial work, stated that his palms and soles had been cold and clammy for 15 years. At times of nervous strain they actually dripped sweat, so that the condition became a social as well as an economic handicap. No other part of his body sweat to an abnormal degree.

On September 10, 1936, a right preganglionic sympathectomy was performed. One week later, the patient after being heated in a chamber at 130°F broke out in a generalized perspiration. The right hand showed no moisture and the right side of his face, neck and upper chest remained strikingly dry, in contrast to the left side, which was covered with large beads of perspiration. On September 19, 1936, a similar operation was performed on the left side.

Three months after the second operation the patient reported that he was back at work and was cured. Six

months later he was seen in New York by a physician, who reported that the hands remained dry, warm and pink.

*Case 5* J R., aged 32 This patient, who had just finished medical school, was about to start on a surgical internship. He was a well-built, athletic individual, but with dripping wet palms and fingers, which made surgical work nearly impossible. In addition to hyperhidrosis he showed a moderate degree of increased vasoconstrictor tone in the extremities. A physical examination showed no other abnormality.

On June 7, 1937, a right preganglionic sympathectomy was done. The patient showed a transitory tendency to perspire in the denervated area about the 4th day after operation. We have observed this on a number of occasions after preganglionic sympathectomy, and have ascribed it to a transitory stimulation of the degenerating preganglionic fibers. It has never lasted over 1 day.

Six months later the patient wrote in answer to a questionnaire that his hand remained practically free from moisture. He had noticed no disagreeable sequelae, and the hand had remained pleasantly warm all the time. He was delighted with the results of the operation.

*Case 6* A McD, aged 36 This patient, a lawyer, well-built but somewhat apprehensive, had noticed excessive sweating of his hands and feet for many years. At first he minded it most in his feet, as his socks were always dripping wet, but at the time of entry his hands were even worse and bothered him extremely in his courtroom work. As I observed him he was constantly wiping his hands with his handkerchief. Except in extremely hot weather, sweating was confined entirely to the characteristic areas. The skin over the hands and feet was corrugated as though the extremities had been soaked in hot water. There had been no visible vasospasm. The general condition was good, and the patient had always been in excellent health. He had tried formalin soaks and found that these helped somewhat with his feet, but very little with his hands. His basal metabolic rate was within normal limits.

On August 31, 1937, a right preganglionic sympathectomy was performed. Since that time his right hand has remained completely dry. Nine months later he returned requesting operation to relieve the extreme sweating of his feet. In spite of frequent formalin soaks he had not been able to reduce the sweating to the point where it would not soak through his shoes. The skin over the palmar areas and toes was severely macerated. On June 2, 1938, a resection of the right lumbar sympathetic chain with the second and third ganglia was done by Dr. Reginald H. Smithwick. On June 9, 1938, a left lumbar sympathectomy was performed. The patient made a very smooth convalescence from both operations and was ready to go home 18 days after the first operation.

In a follow up examination, September 12, 1938, no signs of moisture could be detected in either foot or in the right hand. The patient was most grateful.

#### SUMMARY AND CONCLUSIONS

Excessive sweating of the palmar surfaces and fingers and of the soles and toes is a not uncommon condition in nervous young people. The wetness may become so extreme as to be incapacitating, especially in certain vocations which require skilled work with the hands.

figuring Horner's syndrome can be avoided by leaving intact the palpebral and ocular fibers which pass through the first thoracic root, the first thoracic and inferior cervical sympathetic ganglia. When lumbar sympathectomy is performed on a male patient it is essential not to injure the chain above the second lumbar ganglion. If the fibers which run from the upper lumbar chain to the hypogastric plexus are destroyed, loss of the power of ejaculation and sterility will result. Although a sympathetic denervation of the right hand alone may at times suffice, the procedure must usually be carried out bilaterally. Under these circumstances it is safest to do the operation in two stages. The second operation can be done four days to a week after the first, so that the total period of hospitalization is generally under a fortnight when both arms are denervated, and less than three weeks if both lumbar chains are resected.

#### CASE REPORTS

*Case 1* R. T., aged 25. This woman was a stenographer. She had always had excessive perspiration of the palms of her hands and the soles of her feet, which were continually dripping wet. This was so pronounced that drops of perspiration fell from her fingers and made it extremely difficult for her to work as a secretary. This condition became worse when she was excited or nervous, as on meeting strangers. The patient had a normal basal metabolic rate. No other abnormalities were noted except for the fact that her hands were constantly cool, and the skin of her fingers somewhat redder than normal.

On November 23, 1932, a right thoracic ganglionectomy was performed, with resection of the first and second thoracic sympathetic ganglia. Recovery was uneventful. The patient developed a moderate Horner's syndrome. The hand became completely dry after the operation and 10°F warmer than the left.

The patient was re-examined 4 years later, and still showed the same excessive sweating in her left hand and in both feet. There was a faint but perceptible degree of perspiration in the right palm. She wrote recently that her right hand never sweat and that she was able to work very satisfactorily as a hostess in a hotel.

*Case 2* J. C., aged 23. This patient, who at the time he was first seen was a third year student of medicine, began to notice excessive sweating in the palms and fingers of his hands during the latter part of his high school years. This had become progressively worse through his medical school career. It had become embarrassing to do physical examinations on patients, and when he assisted at operations his rubber gloves would fill with sweat. When he was free from all emotional strain the condition might clear up entirely. He had tried formalin soaks, radiation of the skin and psychotherapy without benefit. Physical examination showed a healthy young adult without any abnormalities except the unusual sweating. His hands were at times distinctly colder than normal, but at other times were quite warm. As he could not afford the time needed for the usual sympathectomy, I discussed with him the possibility of blocking the sudomotor fibers by paravertebral alcohol injection. This was finally decided on, with the understanding that the nerves leading to one hand should be blocked, and a year allowed to intervene

before deciding whether to employ alcohol injection or surgery on the other extremity.

On October 6, 1933, alcohol was injected paravertebrally around the upper three thoracic sympathetic rami and ganglia on the left side, 4 cc. of 95 per cent alcohol at each level. This resulted in a striking Horner's sign and a hot, dry hand. The patient resumed his classwork the next morning and noticed no disagreeable effects except a barely perceptible hyperesthesia along the distribution of the upper intercostal nerves, which lasted about 1 month. The left hand remained completely dry for 6 months, and then showed the slightest possible trace of moisture (Fig. 3). The Horner's sign had gradually disap-

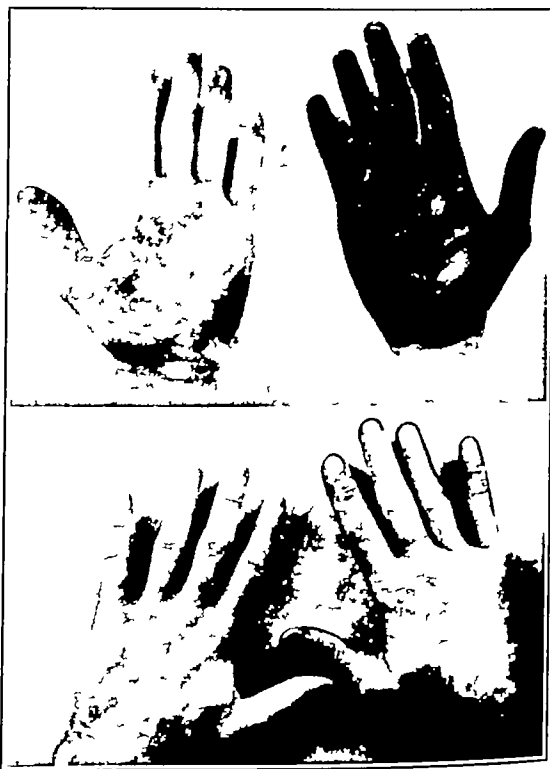


Figure 3 Photographs of the Hands of a Patient (Case 2) One Year after Paravertebral Alcohol Injection on the Left Side (Reproduced from *The Autonomic Nervous System: Anatomy, physiology, and surgical treatment* [New York, 1935] by courtesy of the publisher, The Macmillan Co.)

*There is extreme sweating on the right but only traces of moisture on the left*

peared. At the end of 1 year the patient returned for injection on the opposite side.

On November 30, 1934, a paravertebral alcohol injection was made on the right side. Again the injection caused no inconvenience, and the patient returned to his classes the following morning. No Horner's sign was produced on this side, although the sympathetic denervation of the arm appeared to be complete.

Almost 5 years have now intervened since the injection was done on the left side. The hands continue to be free from any excessive moisture. However, the patient states that in extremely hot weather his hands perspire about as much as those of a normal individual. This indicates that there has been a partial regeneration of the sudomotor fibers.

The technic of paravertebral injections is described elsewhere.<sup>11</sup>

## TULAREMIA

## Report of a Case of the Typhoidal Form

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**T**ULAREMIA is almost unknown in New England, and the rarity of its appearance here is not wholly explained. Francis<sup>1</sup> shows that up to 1937 only 4 cases had been reported from the New England States. In 1929 in North Scituate, Rhode Island, a man contracted tularemia after tearing apart three rabbits found dead on his farm. In 1929 in Massachusetts a man contracted the disease after dressing a cold-storage rabbit obtained from the Boston market. In 1931 in Claremont, New Hampshire, a person became ill after dressing two rabbits killed near-by. A fourth case occurred in 1933 in the Moosehead Lake region of Maine, where a hunter contracted the disease after skinning a red fox. No case has ever been found in Vermont or Connecticut, and none have been reported from anywhere in New England since 1933. An editorial<sup>2</sup> in this *Journal* in 1937 commented on this region's freedom from tularemia, and warned against the importation of Western rabbits to augment our own stock.

The case of tularemia here described is the second ever reported in this state and the first in the Cape Cod region. Its appearance there is felt to be significant, for this is a tick-infested region where, given rabbits infected with tularemia, the more widespread transmission of the disease might easily become established.

## CASE REPORT

The patient, a 10-year-old girl, was first seen in her home in West Falmouth on July 3, 1937, because of fever of unknown cause of 1 week's duration. Seven days before she had had a chill lasting 1 hour. This was followed by a temperature of 102 F, which rose to 103.5°F during the day. There was a slight headache, some constipation and rather more gas in the bowels than usual. Aside from these minor complaints the patient felt well. Prior to June 27 she had been perfectly well in all respects.

The recent past history presented no known contact with infectious disease, no illness during a trip to the Orient, from which she had returned a month previously, no significant association with tuberculosis, no consumption of raw milk at any time and no bites by insects or ticks. In her parents' minds the only incident of importance was that the child's Springer spaniel puppy had been quite ill with fever and cough for 3 days before the onset of her illness. This fact, however, was regarded by her physicians as unimportant and was neglected until later.

The first week of illness was characterized only by the persistence of fever from 101 to 104 F without malaise.

The patient felt well enough to go out and play as usual. The past history was irrelevant.

Physical examination, on July 3, 1 week after onset, revealed nothing of significance except a possibly enlarged spleen. The skin and mucous membrane were clear and without eruptions. The tonsils were large but without evidence of infection. No enlarged lymph nodes could be felt. The heart and lungs were clear. The pulse rate was 99, and the blood pressure 108/68. The extremities and reflexes were normal. There was no stiffness of neck or back. A Kernig test was negative. The urine had been normal on a previous examination, and the white cell count was 6000.

At the first visit the high fever, relatively slow pulse, low white-cell count and probable enlargement of the spleen led to a tentative diagnosis of typhoid or paratyphoid fever. Subsequent laboratory studies failed to substantiate this diagnosis. The Widal test, questionably positive at first, was later three times negative.

On July 12, because the fever continued to range from 101 to 103.5°F, the patient was transferred to the Massachusetts General Hospital for study. Persistently high fever to 103°F and a brisk nosebleed were the sole significant clinical observations during her 4-day hospital stay. She was seen by two consultants, who found her physical examination essentially normal. At no time were skin lesions seen. No lymph nodes were enlarged. The spleen was never thought to be enlarged after the first examination. There were no localizing signs of any sort. The patient was never prostrated and retained a remarkable sense of well being.

On July 16 she was sent home after completion of studies, undiagnosed. Her fever fell by lysis and permanently reached normal September 1, 9 weeks and 3 days after its abrupt onset. Blood collected on the day of discharge was sent to the National Institute of Health in Washington, District of Columbia, to be tested for typhoid fever, undulant fever and tularemia. The blood was reported positive for tularemia in a titer of 1:1280. It was negative for typhoid and undulant fevers.

The white-cell count on June 30 was 6000 and on July 3 had risen to 17,000. On July 12 the hemoglobin was 40 per cent and the red-cell count was 4,530,000. The white-cell count had fallen to 11,400, with 74 per cent polymorphonuclears, 20 per cent lymphocytes, and 6 per cent mononuclears. There was moderate achromia. The corrected sedimentation rate was 0.7 mm per minute and the hematocrit 37.7 per cent. A blood culture taken July 12 showed no growth after incubation for 12 days. A catheter specimen of urine showed no growth. Daily urine specimens were negative except for a few red blood cells on one occasion. Stool examination on July 13 showed no pathogenic organisms. No parasites or amebae were seen on warm stool examination. A throat culture on July 12 showed no hemolytic streptococci. An electrocardiogram on July 12 was within normal limits, and an x-ray film of the chest taken the next day showed the lung fields to be clear. The heart, mediastinum and diaphragms were not remarkable.

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Medical measures of control are unsatisfactory in the more severe cases

Sympathetic denervation of the arm and leg offers a safe and certain cure. The operation results in warm and dry extremities. If care is taken to avoid the ocular fibers (the section of which results in Horner's syndrome) and to leave the highest portion of the lumbar chain in the male intact (in order to preserve the power of ejaculation), there are no annoying sequelae.

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## DISCUSSION

DR. DONALD MUNRO, Boston. There are two things I should like to emphasize. In the first place, I doubt if there is another as skillful a surgeon of the sympathetic nervous system working today as Dr. White, and his description of this operation, which looks and reads so simply, should not be allowed to lead us astray and into thinking that we can do one before breakfast, as it were, because it is not an easy operation to do. Secondly, we should all realize that we have listened to a presentation which we can accept at its absolute face value, and concerning which discussion is unnecessary.

DR. JOHN HOMANS, Boston. I should like to ask Dr. White whether there is any such thing as excessive sweating without at the same time some evidence of vasomotor spasm. Also, in making a diagnosis is it necessary to be sure that one can secure full vasodilatation by a novocain block or in some other way, before using this operation to prevent sweating?

DR. WILLIAM J. MIXTER, Boston. I have watched Dr. White's cases with the greatest interest. The results are little short of marvelous. No one would do this operation for a person who sweats only moderately. There are not very many of these bad cases, but those patients who really sweat profusely are perfectly wretched. They will go to almost any length to get relief. Here is an operation which gives them positive relief with very little risk, an operation which has to be done with a good deal of care, and at the same time one which in proper hands carries a very low mortality.

DR. WHITE (closing). To answer Dr. Homans's first question: most of these patients had cold as well as moist hands, but at least one had hands as warm as those of a normal individual. So far as testing with novocain goes, I think the anatomical arrangement of the sweat fibers is so constant that, if you are doing the operation merely to stop the sweating, there is no need to do a novocain block. We did it in our early cases but we have not used it since then. However, if it is a case of cold as well as sweaty hands, and particularly if there is any scleroderma-tous change, it is best to test and see how much vasodilatation can be obtained by paralyzing the vasoconstrictor nerves.

peared in the town of Falmouth. It appears probable that the child's dog killed or ate one of these imported rabbits with tularemia, or was bitten by an infected tick. In view of the evidence presented, it seems logical to suppose that the puppy's illness was tularemia. The transmission to the child was apparently direct, since no other source could be found.

#### HISTORICAL BACKGROUND

Tularemia as we know it was originally confused with bubonic plague, both clinically and bacteriologically. Wherry<sup>4</sup> in 1908, when he was bacteriologist of the San Francisco Board of Health, published an excellent review of this problem. His account may be briefly summarized as follows:

In 1903, three years after the first appearance of bubonic plague in this country in San Francisco, Assistant Surgeon Rupert Blue, United States officer in charge of plague suppression, suspected that ground squirrels, which were dying in large numbers, were afflicted with the same disease as were human beings, and were responsible for its conveyance to them in the widely scattered areas from which it was being reported. That the squirrels had a plague-like disease was clear, but that they transmitted it directly to human beings was not proved. Soon, however, a boy of ten in Los Angeles was bitten on the finger by a sick ground squirrel which he picked up near his home. Four days later he became ill with a plague-like disease, thought to be bubonic plague. From the suppurating glands of this boy, an organism like the bacillus of plague was cultured. As a result, until 1909 squirrel plague (now known as tularemia) and human plague were thought to be the same disease. In 1910, however, Post-Assistant Surgeon George W. McCoy,<sup>5</sup> of San Francisco, published a paper showing that there was a distinct difference between bubonic plague and squirrel plague, and that although the pathological and bacteriological findings were similar, they were not identical.

In 1911 McCoy and Chapin<sup>6</sup> identified the organism of squirrel plague, cultured it, transmitted it to guinea pigs and named it *Bacterium tularense* (*Pasturella tularensis*), after Tulare County, California, where the disease was first observed.

In 1914 Wherry and Lamb<sup>7</sup> reported the first case of human infection with the organism discovered by McCoy and Chapin. This was a case of ulcerative conjunctivitis with lymphadenitis from which organisms identical with *Pasturella tularensis* were recovered. Since 1914 tularemia has been shown to be widespread throughout the United States, with the exception of New England.

#### CLINICAL TYPES

The literature is filled with clinical, pathological and bacteriological studies of tularemia, but Francis<sup>8-10</sup> has probably contributed most to the early clarification of the disease in its various aspects. He describes four clinical types, as follows: *Ulceroglandular*. The primary lesion at the site of inoculation is a papule of the skin. This papule later ulcerates and is accompanied by enlargement and often ulceration of the regional lymph nodes. *Oculoglandular*. The primary lesion is in the eye (transmitted from the hands) and is accompanied by enlargement of the regional lymph nodes. *Glandular*. No primary lesion is found at the site of inoculation, but there is fever, and infected regional nodes are found. Often there is a generalized adenopathy. *Typhoidal*. Persistent fever is the outstanding feature. There is no primary ulceration and no detectable lymph-node enlargement.

It is with the typhoidal type that we are particularly interested. This type is so named because of its similarity to typhoid fever, with which it is often confused. At other times it passes for fever of unknown origin, septic infection and influenza. The pulmonary lesions in the typhoidal form have led to the diagnosis of tuberculosis or of pneumonia. The cross-agglutinations with *Brucella abortus* and *Br. melitensis* have caused it to be called undulant fever. A clinical diagnosis of typhoidal tularemia is rarely possible. Where persistent, unexplained fever exists, however, specific agglutination tests offer the only clue to diagnosis.

The onset of typhoidal tularemia is abrupt and without warning, and is marked by chills, fever, headache, vomiting, sweating, prostration or joint pains. There is an initial rise of temperature, followed by remission of the fever and symptoms for two or three days, then a return of the fever, which is constantly elevated or spiking, for from three to ten weeks, disappearing by lysis.

It is of interest that patients may retain a sense of well being throughout the course of a typhoidal tularemia of several weeks' duration with persistent fever, however, prostration is usual. Nosebleeds during the second and third weeks are not uncommon. Headache may be severe or lacking. The white-cell count is usually low in the early stages, later rising as high as 16,000. Foshay<sup>11</sup> has shown in a series of 400 unselected cases of acute tularemia that the typhoidal type is a generalized infection from the start, with minor cutaneous or regional lymphatic involvement, or more commonly none at all. In the other three types of the disease the lymphatic system appears to bear the brunt of the attack. Multiple lesions in the deep

Typhoid agglutination was partially positive on a specimen taken July 3 but negative on July 6 and 12 and October 9. Tests for paratyphoid fever were negative on four occasions. Blood taken for undulant fever was negative on July 3. Blood drawn July 16 was negative for undulant fever but positive for tularemia in a titer of 1:1280. Agglutination tests on October 9 were negative for undulant fever, negative for the Weil-Felix reaction and positive for tularemia in a titer of 1:1280.

The tuberculin test was negative to 1 mg. of old tuberculin. A blood Wassermann test was negative. A skin test done on October 9 for tularemia, with a suspension of killed *Pasteurella tularensis* provided by Dr. Lee Foshay, was strongly positive.

It was due solely to the fact that the child's parents referred again and again to her sick dog that the tularemia agglutination was done at all. A young Springer spaniel puppy, which had been in the Middle West during its early months, had been given to the patient a month before the onset of her illness. The dog had been well until three days before the patient fell ill. At that time it became sickly and feverish and coughed, recovering in three days. Since it was an affectionate puppy its contact with the patient was constant and close. She had, however, received no bites or scratches from the dog, or tick or flea bites at any time before her illness. Following the diagnosis of tularemia, blood was collected from the dog on August 4, five weeks after its illness, and was found positive for tularemia in a dilution of 1:40. The source of the dog's infection was not found, but may have been a tick bite or the eating of a rabbit which had died of tularemia.

This is the only case on record where definite relation between the disease in a dog and a human being has been shown. Experimentally tularemia has been produced in dogs, and Francis<sup>1</sup> reports 1 case following a dog bite, but the dog was never shown to have had the disease. Puppies are more easily infected than adult dogs. Although a titer of 1:40 is one of low dilution, it may not go higher than this in human beings known to have had tularemia.<sup>1</sup> The appearance of a positive agglutination in both child and dog in the case reported would seem to be more than coincidence. Infection of the child was probably by the dog's saliva from hand to mouth.

#### IMPORTATION OF WESTERN RABBITS TO CAPE COD

In 1936 the Division of Fisheries and Game of the Massachusetts Department of Conservation<sup>3</sup> authorized the importation into this state of cottontail rabbits from the West. The director of the division, it was announced, had conferred with officials of the New York Conservation Department, which had for a number of years been importing cottontails from the West, and it had been

planned to make the Massachusetts system of importation conform as closely as possible to that employed in New York. Plans were being formulated, it was stated, for the importation of a considerable number of cottontail rabbits during 1937.

Table 1 *Cottontail Rabbits Released by the Division of Fisheries and Game*

TOWN	NO. OF RABBITS	DATE
Harwich	5	March 31 1937
Truro	9	March 31 1937
Wellfleet	5	March 31 1937
Falmouth	8	March 31 1937
Barnstable	6	March 31 1937
Total	33	

During the spring of 1937, western cottontail and jack rabbits were released on Cape Cod, the former by conservation officers and the latter by local sportsmen's clubs, as shown in Tables 1 and 2.\*

J. Arthur Kitson, in charge of propagation in Massachusetts, stated in a letter dated December 8, 1937, that all rabbits received dead were examined by a competent pathologist and that no tularemia was found. But in none of these examinations were guinea pigs inoculated with tissue

Table 2 *Jack Rabbits Released by Sportsmen's Clubs*

TOWN	NO. OF RABBITS	DATE
Harwich	12	Middle of May 1937
Provincetown	16	May 24 1937
Barnstable	14	June 21 1937
Truro	12	March 24 1937
Wellfleet	12	May 4 1937
Dennis	24	Latter part of May 1937
Total	90	

(For the guidance of those especially unfamiliar with tularemia, the disease is altogether too easily overlooked in the gross Guinea-pig inoculation has been shown to be the only sure method of diagnosis and identification.)

With these facts in mind, it seems particularly significant that this young child, with no known source of infection or trauma or bites, developed tularemia in a region where the disease had never been seen. It is also significant that the common wood tick, *Dermacentor variabilis*, is prevalent on Cape Cod, and that these ticks, feeding chiefly on small rodents during the larval and nymphal stages, feed indiscriminately on both men and animals during the adult stage. Thus the danger of tick-borne tularemia is constant in this region.

It is noteworthy that three months after the release of Western cottontail rabbits in the Falmouth district this isolated case of tularemia ap-

\*Information supplied by J. Arthur Kitson.

## SPECIFIC THERAPY

Symptomatic treatment of tularemia still holds the place it should in any acute infection, but specific serum now offers the safest and surest method of treatment. Intravenous chemotherapy with arsenicals<sup>14</sup> and iodides has proved of no value. X-ray therapy<sup>15</sup> for primary local lesions has been thought to shorten the course of the disease if applied in the first four days of the disease, but is of doubtful value. Immunotransfusions have been shown of value, but suitable donors are difficult to find. Foshay<sup>19</sup> reports a case of acute tularemia treated as effectively by immune serum as by antiserum.

The antiserum developed by Foshay<sup>16-18</sup> is of specific therapeutic value. There is, with its use, a definite antitoxic action, with a fall in temperature, disappearance of symptoms and regression of lymph nodes, if present, and healing of primary lesions. The usual dose is 30 cc intravenously for adults, although an additional 15 cc may be given if improvement fails to appear. Severe cases with complications may receive up to 60 or 70 cc. Serum reactions may follow the administration. Goat serums<sup>16</sup> have proved effective in the past. Surgery should be used only for the incision of acute suppurating glands.

## PROPHYLAXIS

The prevalence of the disease among wild rabbits makes its eradication impossible, but those who handle or dress them should protect themselves with rubber gloves and frequent, careful washing of the hands. Possibly hunters and market men who handle rabbits from grossly infested areas should be immunized. Foshay urges this for those doing laboratory work or animal experimentation, feeling that it is the only prophylactic measure of value.

## SUMMARY

A case of tularemia contracted in Falmouth, Massachusetts, is reported in a girl of ten. It is

the second case ever reported in Massachusetts and the fifth in New England.

No known source for this infection could be found except the child's young Springer spaniel puppy. The dog was ill three days before the abrupt onset of the infection in the child, and its blood serum later agglutinated *Past tularensis*, as did the child's.

Three months preceding the appearance of this case Western cottontail and jack rabbits were shipped to Cape Cod. Eight of these rabbits were released in the vicinity of Falmouth.

The conclusion seems justified that the dog killed or ate a Western rabbit that had tularemia, became ill himself and transmitted the disease to the child.

If tularemia has become established on tick-infested Cape Cod, such a condition of affairs is of extreme public-health importance.

A brief review of the historical and clinical aspects of tularemia is presented.

264 Beacon Street.

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- 19 *Idem*. personal communication.

organs and lungs characterize the typhoidal type

The mortality rate of the typhoidal type of tularemia Foshay found to be approximately 40 per cent, nearly four times that of other clinical types, and the incidence of complicating pneumonia four times the average in the other three types

Septicemia, Foshay showed, occurred in 1 out of every 17 cases without forewarning. The chief clinical signs of septicemia are progressive enlargement of the liver and spleen, sometimes with increasing jaundice and septic fever. Hyperpnea and cyanosis, meningal and cerebral involvement, diarrhea, progressive bronchopneumonia, acute renal involvement, pleurisy, pericarditis and peritonitis may appear. Septicemia is the chief cause of death attributable to tularemia alone, but pneumonic lesions were shown to be present in half of Foshay's fatal cases

#### SOURCES OF HUMAN INFECTION

Human beings become infected with *Past tularensis* by contact with the raw flesh or blood of infected animals, by the bites of blood-sucking insects and flies and by the eating of insufficiently cooked infected meat. Francis<sup>1</sup> in a recent report pointed out that twenty varieties of wild life contract and transmit tularemia. The cottontail rabbit, the snowshoe hare and the jack rabbit account for 90 per cent of all human infections

Most infections occur through wounds or abrasions in the skin, most frequently of the hands, but *Past tularensis* can penetrate the unbroken skin. Wood ticks, dog ticks, horseflies, houseflies, fleas and bedbugs have been shown to cause infection. Tree squirrels and opossums have been responsible for cases of tularemia. One case each has been reported from skinning a sage hen, coyote, deer, red fox and bull snake. Two cases each came from contact with quail, ground hog and skunk. Two patients had been scratched by cats. Single cases have followed from the bites of the cat, skunk, coyote, tree squirrel, opossum, hog, lamb, white rat and dog. Contamination in the latter group of cases is believed by Francis to be from the animals' mouths. Market men, hunters and meat dressers are most frequently affected, usually with the ulcerative type. Laboratory workers have frequently been infected, with a high incidence of the typhoidal type of the disease

#### NON-CONTAGIOUSNESS AND IMMUNITY

According to Francis<sup>1</sup> there is no record of transfer of infection from man to man. Doctors, nurses and others attendant on the sick have not contracted the disease. One attack confers a lasting immunity. Blackford,<sup>12</sup> however, reports 2

cases of ulcerative dermatitis where living organisms were obtained five to twenty-one months after the initial infection. Foshay, discussing Blackford's paper, says that relapses are not frequent but may be seen weeks or months after the initial infection. These relapses, he believes, are due to residual living bacteria in the tissues and most commonly occur in cases with ulcerating skin lesions and chronically suppurating lymph nodes

#### AGGLUTINATION TESTS

Francis<sup>8</sup> states that there is apparently a complete absence of agglutinins for *Past tularensis* during the first week of the disease. The appearance of specific agglutinins occurs sometime in the second week, with an abrupt rise in titer in the third week, reaching its maximum in the fourth to seventh week. After the eighth week the titer usually falls, but positive agglutinins have been known to remain as long as twenty years

Serums from cases of tularemia may show agglutinations with *Br abortus* and *Br melitensis*. Francis<sup>8</sup> reports that of 579 such serums 129 showed agglutination with *Br abortus* and *Br melitensis*, while 441 failed to cross-agglutinate. Many serums showing no cross-agglutination had the highest titers (1 1280 to 1 2560) against *Past tularensis*. Serums from tularemia patients agglutinate *Past tularensis* in much higher titer and much more quickly than they do *Br abortus* or *Br melitensis*. Serums from cases of undulant fever may show cross-agglutination with *Past tularensis*. Of 93 such serums, 31 showed some degree of cross-agglutination

Foshay<sup>10</sup> recognizes cross-agglutination reactions between tularemic serums and those from cases of Rocky Mountain spotted fever. He finds that tularemic animal serums invariably show a positive Weil-Felix reaction, but those of human subjects rarely do. He has recorded only 4 cases in which human serums have given such a reaction

#### SKIN TESTS

Foshay<sup>13</sup> has shown that an intradermal test done with a detoxified bacterial suspension of *B tularensis* is the earliest diagnostic aid for determining the presence of tularemia. The allergic skin response is specific and reliable. Positive reactions occur as early as the fourth day of illness, almost a week before agglutinins appear in the blood. He has demonstrated that positive skin reactions are constant in the presence of tularemia, but do not occur in normal persons or in the presence of other acute infections



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## NEOPLASMS OF THE TESTIS\*

## A Study of the Results of Orchidectomy, With and Without Irradiation

HUGH CABOT, M.D.,† AND JOSEPH BERKSON, M.D.‡

ROCHESTER, MINNESOTA

THIS paper originated as the result of the return to the Mayo Clinic, for other causes, of several patients who had been operated on for highly malignant tumors of the testis and who appeared to have survived longer than was considered quite reasonable. Now it is very difficult and probably impossible to determine the accepted standard opinion as to the expectancy of life for victims of this malady. The literature lends but feeble assistance to such endeavors, since the reports are made in such form as to be quite difficult of comparison. Commonly a certain percentage of patients are stated to have survived operation or irradiation or both but without clear indication of the duration of survival. Again, an array of figures is presented on patients said to have had a tumor of the testis, but it is not clear what the word "tumor" is intended to convey. However, we think it may safely be suggested that average expert opinion holds that practically all tumors of the testis are malignant, that the malignancy of most of them is of relatively high grade, with the exception of the adult teratoma, that the disease is very fatal and that survival beyond five years is uncommon, that irradiation in competent hands has materially extended the life expectancy, with or without orchidectomy, and that the relatively recent discovery of the presence of anterior pituitary-like substances in the urine is of both diagnostic and prognostic importance.

We shall be able to submit statistical data showing the ultimate result in a relatively large number of cases. Particular attention is here called to the fact that in the series analyzed in this study for survival and to be presently referred to, 98 per cent of the patients were followed for at least five years. Unfortunately we shall not be able to offer any evidence on the value, either in diagnosis or prognosis, of the discovery of anterior pituitary-like substances in the urine. Our experience with this method is still confined to a group of cases too small to warrant any definite conclusions.

This study is based on an analysis of 363 cases seen at the Mayo Clinic between January 1, 1910,

and January 1, 1937. The mean age of these patients was 36.2 years, the youngest being seven years and the oldest eighty-four years. It is commonly stated that in something like 80 per cent of cases the disease occurs between the twentieth and fortieth years. Our figures tend to show a somewhat higher range. Sixty-two per cent of the patients were between the ages of twenty and forty, and 20.9 per cent between forty and fifty. This is a somewhat higher figure than is commonly given.

Of the 363 patients, 148 were seen in the first instance at the Mayo Clinic, 215 came to the clinic only after they had been treated or a diagnosis had been made elsewhere, and they were

Table 1 *Summary of Treatment in All Cases, with a Listing of the Tissue Available for Re-examination*

TREATMENT	NO. OF CASES	TISSUE AVAILABLE FOR HISTOLOGICAL RE-EXAMINATION	
		TESTICULAR	METASTATIC
Orchidectomy	142		
With irradiation	105	101	0
Without irradiation	37	36	0
Other operation	6		
Exploration	3	0	0
Biopsy only	3	1	0
Irradiation only at clinic	215		
With previous operation elsewhere*	165	13	6
Without previous operation elsewhere†	50	0	6
Totals	363	156	12

\*For example, orchidectomy exploration

†Except possibly biopsy

sent primarily for irradiation, many of them having very extensive metastases. Of the 148 first seen at the clinic, 142 were treated by orchidectomy, with or without irradiation. Of the 215 other patients, all were treated at the clinic by irradiation, and 165 of them had had operation elsewhere. This distribution is shown in Table 1.

## ANALYSIS OF CASES TREATED BY ORCHIDECTOMY WITH OR WITHOUT IRRADIATION

Since the evidence in regard to patients coming to the clinic after operation elsewhere was necessarily incomplete, we have thought that the purposes of this paper would be best served by a careful analysis of the 142 cases in which orchidectomy was performed at the clinic and in which all the pathological examinations were made there.

\*Read before the meeting of the American Medical Association, San Francisco, June 13-17, 1938.

†Professor of surgery, University of Minnesota Graduate School, Minneapolis; consulting surgeon, Mayo Clinic, Rochester.

‡Medical statistician, Mayo Clinic.

Table 2 shows the pathological diagnoses made on a recent check of the specimens\*. The most striking point to be observed is the relatively high percentage of neoplasms classified as seminoma (59.2 per cent). It should be stated here that we

Table 2. *Pathological Findings in the 142 Selected Cases*

HISTOLOGICAL DIAGNOSIS	NO OF CASES	PER CENT	RATING OF MALIGNANCY				
			GRADE 1	GRADE 2	GRADE 3	GRADE 4	NOT STATED
Adenocarcinoma*	28	19.7	0	4	9	12	3
Adenocarcinoma with teratoma	21	14.8	1	2	13	5	0
Seminoma	84	59.2	0	0	0	84	0
Miscellaneous†	9	6.3	0	0	0	0	9
Total	142	100	1	6	22	101	12

\*Two cases not recently reviewed

†Teratoma 4 embryoma, 3 sarcoma 1 no histological diagnosis, 1 Three cases were not recently reviewed

regard seminoma as a variety of carcinoma, and are still neutral in our opinion as to whether it is a separate entity, a view long championed by

may be finally determined. The other point clearly brought out by this table is the high grade of malignancy of the group classified as seminoma when malignancy is rated by the examination of the histologic specimen. It will be noted that all 84 of these cases are classified as Grade 4. This is in some, though not very striking, contrast to those classified as adenocarcinoma or adenocarcinoma with teratoma.

### Three-, Five- and Ten-Year Survivals

These figures, according to type of lesion and irradiation, are presented in Table 3. It is at once evident that the survival rate of patients having so-called seminoma is very much higher throughout all these periods than that of patients having tumors classified as carcinoma, irrespective of the use of irradiation. Among the patients with carcinoma, there appears to be a higher survival rate for the three- and five-year periods in those treated

Table 3. *Three-, Five- and Ten-Year Survivals*

CLASSIFICATION	PA TIENTS TREAT ED*	PA TIENTS TRACED	LIVED THREE OR MORE YEARS		PA TIENTS TREAT ED*	PA TIENTS TRACED	LIVED FIVE OR MORE YEARS		PA TIENTS TREAT ED*	PA TIENTS TRACED	LIVED TEN OR MORE YEARS	
			NO	PER CENT OF THOSE TRACED			NO.	PER CENT OF THOSE TRACED			NO	PER CENT OF THOSE TRACED
ACCORDING TO TYPE OF LESION AND IRRADIATION												
Carcinoma†												
All cases	43	43	14	32.6	41	41	12	29.3	31	30	8	26.7
Without irradiation	12	12	5	41.7	12	12	5	41.7	12	11	3	27.3
With irradiation	31	31	9	29.0	29	29	7	24.1	19	19	5	26.3
Seminoma												
All cases	71	69	53	76.8	64	62	42	67.7	41	38	18	47.4
Without irradiation	21	19	13	68.4	19	17	10	58.8	18	15	7	46.7
With irradiation	50	50	40	80.0	45	45	32	71.1	23	23	11	47.9
ACCORDING TO TYPE OF LESION AND METASTASIS												
Carcinoma†												
Without metastasis.	29	29	12	41.4	27	27	10	37.0	21	20	7	35.0
With metastasis	14	14	2	14.3	14	14	2	14.3	10	10	1	10.0
Seminoma												
Without metastasis.	55	54	45	83.3	49	48	36	75.0	32	30	15	50.0
With metastasis	16	15	8	53.3	15	14	6	42.9	9	8	3	37.5
ACCORDING TO TYPE AND DURATION OF LESION												
Carcinoma†												
Duration less than 1 year	31	31	11	35.5	30	30	10	33.3	24	23	7	30.4
Duration 1 year or more	10	10	3	30.0	9	9	2	22.2	5	5	1	20.0
Seminoma												
Duration has been 6 months	14	14	8	57.1	14	14	8	57.1	8	8	3	37.5
Duration 6 months 1 year	16	15	12	80.0	13	12	8	66.6	9	8	4	50.0
Duration 1 year or more	31	30	25	83.3	27	26	18	69.2	16	14	7	50.0

Inquiry as of January 1 1937. The three year group comprises the patients treated three or more years prior to the time of inquiry that is, 1933 or earlier; the five year group comprises those treated in 1931 or earlier; the ten year group comprises those treated in 1926 or earlier.

†Includes carcinoma with teratoma.

Chevassu but not yet finally determined. It is not impossible that with the accumulation of evidence in regard to the presence and quantity of anterior pituitary-like hormonal substances in the urine, the question of the origin of this tumor

by orchidectomy without irradiation than in those treated by orchidectomy with irradiation. These figures, however, are somewhat misleading, since the number of patients not treated with irradiation is relatively small and hence, statistically, relatively unreliable. Moreover, the group of patients given irradiation contained a much larger per-

Excluded 15 cases in which tissue was no longer available for examination.

## NEOPLASMS OF THE TESTIS\*

## A Study of the Results of Orchidectomy, With and Without Irradiation

HUGH CABOT, M.D.,† AND JOSEPH BERKSON, M.D.‡

ROCHESTER, MINNESOTA

THIS paper originated as the result of the return to the Mayo Clinic, for other causes, of several patients who had been operated on for highly malignant tumors of the testis and who appeared to have survived longer than was considered quite reasonable. Now it is very difficult and probably impossible to determine the accepted standard opinion as to the expectancy of life for victims of this malady. The literature lends but feeble assistance to such endeavors, since the reports are made in such form as to be quite difficult of comparison. Commonly a certain percentage of patients are stated to have survived operation or irradiation or both but without clear indication of the duration of survival. Again, an array of figures is presented on patients said to have had a tumor of the testis, but it is not clear what the word "tumor" is intended to convey. However, we think it may safely be suggested that average expert opinion holds that practically all tumors of the testis are malignant, that the malignancy of most of them is of relatively high grade, with the exception of the adult teratoma, that the disease is very fatal and that survival beyond five years is uncommon, that irradiation in competent hands has materially extended the life expectancy, with or without orchidectomy, and that the relatively recent discovery of the presence of anterior pituitary-like substances in the urine is of both diagnostic and prognostic importance.

We shall be able to submit statistical data showing the ultimate result in a relatively large number of cases. Particular attention is here called to the fact that in the series analyzed in this study for survival and to be presently referred to, 98 per cent of the patients were followed for at least five years. Unfortunately we shall not be able to offer any evidence on the value, either in diagnosis or prognosis, of the discovery of anterior pituitary-like substances in the urine. Our experience with this method is still confined to a group of cases too small to warrant any definite conclusions.

This study is based on an analysis of 363 cases seen at the Mayo Clinic between January 1, 1910,

and January 1, 1937. The mean age of these patients was 36.2 years, the youngest being seven teen months and the oldest eighty-four years. It is commonly stated that in something like 80 per cent of cases the disease occurs between the twentieth and fortieth years. Our figures tend to show a somewhat higher range. Sixty-two per cent of the patients were between the ages of twenty and forty, and 20.9 per cent between forty and fifty. This is a somewhat higher figure than is commonly given.

Of the 363 patients, 148 were seen in the first instance at the Mayo Clinic, 215 came to the clinic only after they had been treated or a diagnosis had been made elsewhere, and they were

Table 1 Summary of Treatment in All Cases with a Listing of the Tissue Available for Re-examination

TREATMENT	NO. OF CASES	TISSUE AVAILABLE FOR HISTOLOGICAL RE-EXAMINATION	
		TESTICULAR	METASTATIC
Orchidectomy	142		
With irradiation	105	101	0
Without irradiation	37	36	0
Other operation	6		
Exploration	3	0	0
Biopsy only	3	1	0
Irradiation only at clinic	215		
With previous operation elsewhere*	165	13	6
Without previous operation elsewhere†	50	0	6
Totals	363	156	12

\*For example, orchidectomy exploration.

†Except possibly biopsy.

sent primarily for irradiation, many of them having very extensive metastases. Of the 148 first seen at the clinic, 142 were treated by orchidectomy, with or without irradiation. Of the 215 other patients, all were treated at the clinic by irradiation, and 165 of them had had operation elsewhere. This distribution is shown in Table 1.

## ANALYSIS OF CASES TREATED BY ORCHIDECTOMY WITH OR WITHOUT IRRADIATION

Since the evidence in regard to patients coming to the clinic after operation elsewhere was necessarily incomplete, we have thought that the purposes of this paper would be best served by a careful analysis of the 142 cases in which orchidectomy was performed at the clinic and in which all the pathological examinations were made there.

Read before the meeting of the American Medical Association, San Francisco, June 13-17, 1938.

†Professor of surgery, University of Minnesota Graduate School, Minneapolis; consulting surgeon, Mayo Clinic, Rochester.

‡Medical statistician, Mayo Clinic.

Table 2 shows the pathological diagnoses made on a recent check of the specimens\*. The most striking point to be observed is the relatively high percentage of neoplasms classified as seminoma (59.2 per cent). It should be stated here that we

Table 2. *Pathological Findings in the 142 Selected Cases*

HISTOLOGICAL DIAGNOSIS	NO OF CASES	PER CENT	RATING OF MALIGNANCY				
			GRADE 1	GRADE 2	GRADE 3	GRADE 4	NOT STATED
Adenocarcinoma*	28	19.7	0	4	9	12	3
Adenocarcinoma with teratoma	21	14.8	1	2	13	5	0
Seminoma	84	59.2	0	0	0	84	0
Miscellaneous†	9	6.3	0	0	0	0	9
Total	142	100	1	6	22	101	12

\*Two cases not recently reviewed

†Teratoma 4 embryoma 3 sarcoma 1 no histological diagnosis 1

Three cases were not recently reviewed.

regard seminoma as a variety of carcinoma, and are still neutral in our opinion as to whether it is a separate entity, a view long championed by

may be finally determined. The other point clearly brought out by this table is the high grade of malignancy of the group classified as seminoma when malignancy is rated by the examination of the histologic specimen. It will be noted that all 84 of these cases are classified as Grade 4. This is in some, though not very striking, contrast to those classified as adenocarcinoma or adenocarcinoma with teratoma.

### Three-, Five- and Ten-Year Survivals

These figures, according to type of lesion and irradiation, are presented in Table 3. It is at once evident that the survival rate of patients having so-called seminoma is very much higher throughout all these periods than that of patients having tumors classified as carcinoma, irrespective of the use of irradiation. Among the patients with carcinoma, there appears to be a higher survival rate for the three- and five-year periods in those treated

Table 3. *Three-, Five- and Ten-Year Survivals*

CLASSIFICATION	PA TIENTS TREAT ED*		PA TIENTS TRACED		LIVED THREE OR MORE YEARS		LIVED FIVE OR MORE YEARS		PA TIENTS TREAT ED*		PA TIENTS TRACED		LIVED TEN OR MORE YEARS		
				PER CENT OF THOSE TRACED	NO		NO	PER CENT OF THOSE TRACED					NO	PER CENT OF THOSE TRACED	
ACCORDING TO TYPE OF LESION AND IRRADIATION															
Carcinoma†															
All cases	43	43	14	32.6			41	41	12	29.3		31	30	8	26.7
Without irradiation	12	12	5	41.7			12	12	5	41.7		12	11	3	27.3
With irradiation	31	31	9	29.0			29	29	7	24.1		19	19	5	26.3
Seminoma															
All cases	71	69	53	76.8			64	62	42	67.7		41	38	18	47.4
Without irradiation	21	19	13	68.4			19	17	10	58.8		18	15	7	46.7
With irradiation	50	50	40	80.0			45	45	32	71.1		23	23	11	47.9
ACCORDING TO TYPE OF LESION AND METASTASIS															
Carcinoma†															
Without metastasis	29	29	12	41.4			27	27	10	37.0		21	20	7	35.0
With metastasis	14	14	2	14.3			14	14	2	14.3		10	10	1	10.0
Seminoma															
Without metastasis	55	54	45	83.3			49	48	36	75.0		32	30	15	50.0
With metastasis	16	15	8	53.3			15	14	6	42.9		9	8	3	37.5
ACCORDING TO TYPE AND DURATION OF LESION															
Carcinoma†															
Duration less than 1 year	31	31	11	35.5			30	30	10	33.3		24	23	7	30.4
Duration 1 year or more	10	10	3	30.0			9	9	2	22.2		5	5	1	20.0
Seminoma															
Duration has been 6 months	14	14	8	57.1			14	14	8	57.1		8	8	3	37.5
Duration 6 months 1 year	16	15	12	80.0			13	12	8	66.6		9	8	4	50.0
Duration 1 year or more	31	30	25	83.3			27	26	18	69.2		16	14	7	50.0

Inquiry as of January 1, 1937. The three year group comprises the patients treated three or more years prior to the time of inquiry that is, 1933 or earlier; the five year group comprises those treated in 1931 or earlier; the ten year group comprises those treated in 1926 or earlier.

\*Includes carcinoma with teratoma.

Chevassu but not yet finally determined. It is not impossible that with the accumulation of evidence in regard to the presence and quantity of anterior pituitary-like hormonal substances in the urine, the question of the origin of this tumor

by orchidectomy without irradiation than in those treated by orchidectomy with irradiation. These figures, however, are somewhat misleading, since the number of patients not treated with irradiation is relatively small and hence, statistically, relatively unreliable. Moreover, the group of patients given irradiation contained a much larger per-

Except in 3 cases in which tissue was no longer available for examination.

centage of those with metastases (42 per cent) than did the group without irradiation (8 per cent). It is interesting to note that at the end of ten years there is no substantial evidence that the survival rate has been affected by irradiation.

Turning now to the patients with seminoma treated by orchidectomy, there is a substantial difference, favorable to the group that had irradiation, in the survival rates for the three- and five-year periods. On the other hand, there is no clear evidence that the survival rate at the end of the ten-year period has been significantly influenced by irradiation. The more favorable three- and five-year rates for the group that had irradiation is the more impressive when we note the facts with respect to metastases. This group had a somewhat larger percentage of known metastases (26 per cent) than the patients treated by orchidectomy without irradiation (15 per cent). Thus the evidence in favor of the value of irradiation for patients with this lesion seems substantial, and it is a fair conclusion that the survival rate for the three- and five-year periods is improved by this treatment.

The situation according to type of lesion and the known presence or assumed absence of metastases is also shown in Table 3. It should, of course, be understood that many of the patients in whom metastasis was not noted may be assumed to have had some extension of the disease to the lymph nodes, which were nevertheless not sufficiently enlarged to be palpable. In fact, the diagnosis of metastasis by physical examination, except where the growth is massive, is notoriously uncertain. On the other hand, Table 3 clearly shows that the prognosis at all three periods is distinctly better for patients in whom metastasis is not known to be present. Perhaps the most outstanding fact here shown is the extraordinarily high survival rate (75 per cent) of patients with seminoma but without known metastasis over the five-year period. Again, the finding of a lower survival rate for the groups with known metastasis is made more striking if the relative amount of irradiation is considered. The percentage of patients with irradiation was higher in the group with metastasis in respect to both the carcinomas and the seminomas. Despite this, the survival rates were considerably lower among individuals showing obvious metastasis, demonstrating how serious a prognostic factor is the observation of metastasis.

Survivals according to type and known duration of the lesion before treatment are likewise shown in Table 3. It has long been assumed that relatively early diagnosis is of great importance in prognosis. Table 3 does not very clearly bear out

this view. In the group classified as carcinoma, the survival rate over the three-, five- and ten-year periods is somewhat higher for those patients in whom the known duration was less than a year. On the other hand, the difference is small and of doubtful statistical significance.

In regard to the cases of seminoma, the situation is even more confusing. It will be noted that in this group the lesions were divided into those with duration of less than six months, of six months to one year and of one year or more. There is a regularly progressive difference in the survival rates unfavorable to those with lesions of short duration among these three groups. As between the group with lesions of less than six months' duration and that with lesions of six months to a year's duration, the difference is substantial,

Table 4 Twenty Year Survivals

CASE NO.	YEAR OF TREATMENT	AGE	PATHOLOGICAL REPORT	LAST REPORT	DURATION OF LIFE FOLLOWING TREATMENT
		37			37
1	1910	36	Seminoma no metastasis	Living	27
2	1910	24	Adenocarcinoma Grade 3 (not a seminoma and apparently not in a teratoma) no metastasis	Living	26
3	1911	27	Adenocarcinoma Grade 2 (not a seminoma) no metastasis	Living	76
4	1912	46	Seminoma no metastasis	Dead leukemia	25
5	1912	38	Seminoma no metastasis	Living	25
6	1917	52	Seminoma no metastasis	Living	70

between the latter and the group with lesions of a year or more the difference is meager. On careful consideration, we think that the apparently less favorable result obtained for the group with lesions of less than six months' duration is probably more apparent than real. One of us (J. B.\*) has previously pointed out that in studying the life expectancy of patients with cancer in other regions, the same apparently unfavorable result of early diagnosis appeared. This is perhaps due to the fact that the patients who appear relatively early are likely to have what we are pleased to call very malignant lesions. In this series, for instance, we find some substantiation of this theory in the fact that the groups with lesions of longer duration contain a somewhat smaller percentage of patients showing metastasis. This is of course another way of saying that the relation of the cancer to the host is weighted in favor of the cancer. The patients who do not present themselves for a year or more thus represent a certain survival group who, for some mysterious reason, are better able to resist the disease. Nevertheless,

Unpublished data

so far as the figures go they suggest that we must consider the possibility that very early diagnosis is not of the overwhelming importance which has been suggested

### *Twenty-Year Survival*

Finally, Table 4 shows a group of 6 cases in which the patients survived more than twenty years. Of the lesions, 4 were classified as seminomas and 2 as adenocarcinomas. None of the patients with seminoma had known metastasis. The adenocarcinomas were classified respectively as Grade 3 and Grade 2 lesions, these patients also had no known metastases. These cases are presented only as evidence that, in the absence of metastasis, a small group of patients will survive even without irradiation.

### SUMMARY

This study is based on a follow-up of 363 patients with tumors of the testis seen at the Mayo Clinic between 1910 and 1937. Of this number, 215 were seen only after the diagnosis had been made elsewhere, and in some cases after part of the treatment had been carried out. In order to deal only with patients whose condition was completely observed and treated at the clinic, cases of this type were selected for careful study.

Of these 142 patients, in 59.2 per cent the tumors were classified as seminomas, in 34.5 per cent

as adenocarcinomas of various forms, in 6.3 per cent as miscellaneous types of cancer.

The ten-year survival rate of patients having seminoma was found to be relatively high as compared with what is, we think, the commonly held opinion. Thus, 47.4 per cent were alive and apparently well ten years or more after treatment. This should be compared with the survival rate of the patients classified as having carcinoma, which was 26.4 per cent.

The survival rate of seminoma is much higher than that of carcinoma at five years, being 67.7 per cent as compared with 29.3 per cent.

Irradiation seems to materially improve the three- and five-year survival rates for seminoma. Thus, of the patients treated by orchidectomy followed by irradiation, the survival rate at three years was 80.0 per cent, as compared with 68.4 per cent of those not treated by irradiation. At five years the survival rate was 71.1 per cent of the irradiated cases, as compared with 58.8 per cent of those not so treated. Irradiation does not appear to have any important effect on the survival rate at ten years or over. Of the patients treated by irradiation, 47.9 per cent lived more than ten years, as compared with 46.7 per cent of those not so treated.

Of these 142 patients, 6 lived twenty years or more, 2 had carcinoma and 4 had seminoma, and none were treated by irradiation.

## SURVEY OF ALCOHOLIC PATIENTS ADMITTED TO THE BOSTON PSYCHOPATHIC HOSPITAL IN 1937\*

JOHN B. DYNES, M.D.†

BOSTON

THE alcoholic patients admitted to the Boston Psychopathic Hospital during 1937 comprised almost one fifth of the total admissions. This is a marked increase over 1927 (during the Prohibition Era), when such patients numbered approximately one tenth of admissions. In 1937, patients having serologic syphilis totaled only 8.4 per cent of admissions, while disorders diagnosed as dementia praecox and manic-depressive psychosis numbered approximately 15 and 16 per cent, respectively. Alcoholic patients present points of interest other than their gross number, and it is primarily with these in mind that this survey was undertaken.

In 1937, 382 alcoholic patients were admitted to

the hospital, their cases were diagnosed as shown in Table 1.

Table 1 Diagnoses

Diagnosis	No. of Cases		
	MEN	WOMEN	TOTAL
Alcoholism without psychosis	123	27	150
Alcoholic psychosis			
Delirium tremens	103	10	113
Acute hallucinosis	16	3	19
Korsakow's psychosis	3	2	5
Other types	64	17	81
Miscellaneous	12	2	14
Totals	321	61	382

\*Cases diagnosed as psychopathic personality with alcoholism, psychosis with drug addiction and alcoholism, and so forth.

The monthly admission rate of alcoholic patients (Table 2) shows slight peaks in September, June and December, without any obvious explanation.

From the Boston Psychopathic Hospital.

†Senior physician, Boston Psychopathic Hospital.

centage of those with metastases (42 per cent) than did the group without irradiation (8 per cent). It is interesting to note that at the end of ten years there is no substantial evidence that the survival rate has been affected by irradiation.

Turning now to the patients with seminoma treated by orchidectomy, there is a substantial difference, favorable to the group that had irradiation, in the survival rates for the three- and five-year periods. On the other hand, there is no clear evidence that the survival rate at the end of the ten-year period has been significantly influenced by irradiation. The more favorable three- and five-year rates for the group that had irradiation is the more impressive when we note the facts with respect to metastases. This group had a somewhat larger percentage of known metastases (26 per cent) than the patients treated by orchidectomy without irradiation (15 per cent). Thus the evidence in favor of the value of irradiation for patients with this lesion seems substantial, and it is a fair conclusion that the survival rate for the three- and five-year periods is improved by this treatment.

The situation according to type of lesion and the known presence or assumed absence of metastases is also shown in Table 3. It should, of course, be understood that many of the patients in whom metastasis was not noted may be assumed to have had some extension of the disease to the lymph nodes, which were nevertheless not sufficiently enlarged to be palpable. In fact, the diagnosis of metastasis by physical examination, except where the growth is massive, is notoriously uncertain. On the other hand, Table 3 clearly shows that the prognosis at all three periods is distinctly better for patients in whom metastasis is not known to be present. Perhaps the most outstanding fact here shown is the extraordinarily high survival rate (75 per cent) of patients with seminoma but without known metastasis over the five-year period. Again, the finding of a lower survival rate for the groups with known metastasis is made more striking if the relative amount of irradiation is considered. The percentage of patients with irradiation was higher in the group with metastasis in respect to both the carcinomas and the seminomas. Despite this, the survival rates were considerably lower among individuals showing obvious metastasis, demonstrating how serious a prognostic factor is the observation of metastasis.

Survivals according to type and known duration of the lesion before treatment are likewise shown in Table 3. It has long been assumed that relatively early diagnosis is of great importance in prognosis. Table 3 does not very clearly bear out

this view. In the group classified as carcinoma, the survival rate over the three-, five- and ten-year periods is somewhat higher for those patients in whom the known duration was less than a year. On the other hand, the difference is small and of doubtful statistical significance.

In regard to the cases of seminoma, the situation is even more confusing. It will be noted that in this group the lesions were divided into those with duration of less than six months, of six months to one year and of one year or more. There is a regularly progressive difference in the survival rates unfavorable to those with lesions of short duration among these three groups. As between the group with lesions of less than six months' duration and that with lesions of six months to a year's duration, the difference is substantial,

Table 4 *Twenty-Year Survivals*

CASE NO.	YEAR OF TREATMENT	AGE	PATHOLOGICAL REPORT		LAST REPORT	DURATION OF LIFE FOLLOWING TREATMENT
		yr				yr
1	1910	36	Seminoma	no metastasis	Living	27
2	1910	24	Adenocarcinoma Grade 3 (not a seminoma and apparently not in a teratoma)	no metastasis	Living	26
3	1911	27	Adenocarcinoma Grade 2 (not a seminoma)	no metastasis	Living	26
4	1912	46	Seminoma	no metastasis	Dead	25
5	1912	38	Seminoma	no metastasis	Living	25
6	1917	52	Seminoma	no metastasis	Living	20

between the latter and the group with lesions of a year or more the difference is meager. On careful consideration, we think that the apparently less favorable result obtained for the group with lesions of less than six months' duration is probably more apparent than real. One of us (J B\*) has previously pointed out that in studying the life expectancy of patients with cancer in other regions, the same apparently unfavorable result of early diagnosis appeared. This is perhaps due to the fact that the patients who appear relatively early are likely to have what we are pleased to call very malignant lesions. In this series, for instance, we find some substantiation of this theory in the fact that the groups with lesions of longer duration contain a somewhat smaller percentage of patients showing metastasis. This is of course another way of saying that the relation of the cancer to the host is weighted in favor of the cancer. The patients who do not present themselves for a year or more thus represent a certain survival group who, for some mysterious reason, are better able to resist the disease. Nevertheless,

Unpublished data



lagra, or only 10 per cent of the total alcoholic admissions. With neuritis we assume that there has been vitamin deficiency resulting finally in the clinical syndrome of the disease. This is true also of pellagra. It seems strange that more patients did not develop clinical manifestations of both these disturbances, as the dietary history was definitely at fault in many more cases than developed these diseases. It is of interest that only 1 patient in the series had a gastric ulcer—a low incidence which may have no significance for our study.

The urine examinations showed evidence of some form of abnormality (albumin, sugar, white cells, red cells or casts) in 250 cases (68 per cent). In many cases the abnormal findings cleared before the patient had left the hospital.

Eighty-five patients (22.0 per cent) had been in the hospital on previous occasions. Eighty-four had a history of previous psychotic disorder due to alcohol, with no hospital admission. All the patients gave a history of drunkenness on previous occasions. In 5 cases no information as to previous alcoholic disorder was available.

The mental status of the patients in this series shows certain factors of interest. The classic description of a patient with delirium tremens is that of an individual who is fearful and tremulous, and has periods of delirium and confusion associated with visual hallucinations of animals or insects, usually dogs, snakes, rodents or elephants. In this series only 57 patients exhibited any evidence of fear. Visual hallucinations of dogs and insects were the most frequent, occurring in 15 patients. Visual hallucinations of snakes occurred in 14, and those of rodents in only 1, in contrast to the assumed frequency of the latter. Horses appeared in 10 cases, while other animals not specified were seen in 9. Faces were seen by 10 patients, and flashes of light by 10. Birds, cats or dead bodies were noted in 5 cases. Elephants were seen by 4 patients, only 1 patient saw a pink elephant, and in this case the hallucination occurred as a retrospective falsification. Lions and tigers were seen by only 2 patients, whales were seen by 1 and a hippopotamus by 1. There was no correlation between the size of the animal and the duration of the delirium. Hallucinations of smell were present in only 3 cases. Lilliputian hallucinations were experienced by 3 patients. In only 1 case was there an occupational delirium. Forty-eight patients believed that hostile gangs or police were chasing them, the sensation being usually accompanied by visual hallucinations.

Accurate information concerning the duration of the psychosis prior to entry was unavailable, but the duration of mental symptoms after reach-

ing the hospital is shown by our own records. In 198 cases the symptoms had disappeared before entering the hospital. In 72 they were considered chronic, that is, they persisted after a ten-day observation period. In 63 cases they lasted one day, in 25 two days, in 11 three days, in 2 four days, in 1 five days, in 3 six days, and in 1 seven days. The longest episode of delirium tremens in the hospital was seven days. In the great majority of cases the symptoms had either cleared before entry or lasted only one or two days after it. The type of treatment seemed to have little influence on the duration of the psychosis. Some patients who received no drugs or other form of medication cleared as soon as those receiving sedative drugs. Paraldehyde in doses of 3 to 20 cc. was used most frequently, and was of considerable value in the management of acutely excited and delirious patients.

Depression was a frequent symptom, occurring in 89 patients (23.0 per cent). Forty-six of these had attempted suicide while under the influence of alcohol, and 17 others made suicidal threats. Twenty-six patients were depressed without previous suicidal attempts or threats of suicide. The most frequent precipitating factor was domestic difficulty. This may be an important disturbing element, but in many cases it is impossible to untangle cause from effect. In some cases it seems highly probable that domestic friction was the result rather than the cause of the alcoholic episodes. It is of interest that 122 patients (32.0 per cent) were unemployed. This was undoubtedly a contributing or precipitating factor in many cases.

Repressed homosexuality is considered by many to be the principal underlying cause of alcoholism. In this series 17 patients (4.4 per cent) admitted overt homosexuality, but this group included only 1 woman out of a total of 61. In 18 patients (4.7 per cent) there were hallucinations of homosexual abuse. In 48 patients (12.8 per cent), as stated above, there were delusions and hallucinations of being chased by gangs or police. It may be argued that the character of these delusions and hallucinations points, to latent homosexuality, but this seems to place an interpretation on the clinical material which is not warranted under the circumstances. There are undoubtedly many factors which either contribute to or are directly responsible for alcoholic excess.

#### SUMMARY

The number of alcoholic patients admitted to the Boston Psychopathic Hospital in 1937 almost doubled as compared with those admitted in 1927. This increase was not present among the groups with syphilis, manic-depressive psychoses and dementia praecox. It is not evident why the proportion of

As would be expected from the large proportion of Irish in Boston, the Irish alcoholic patients far outnumber all other nationalities. In 1937 there were 190 alcoholic patients of Irish extraction, or approximately half the total alcoholic admissions. The English numbered 58 (15 per cent). Thirty-eight (10 per cent) were of mixed race, while the remainder of the admissions were made up of widely scattered racial groups.

Most of the patients were between thirty and fifty years of age. Three were twenty or younger,

Table 2 *Admissions by Months*

January	29	July	34
February	24	August	33
March	29	September	40
April	29	October	33
May	32	November	23
June	39	December	36

56 were between twenty-one and thirty, 116 between thirty-one and forty, 148 between forty-one and fifty, 52 between fifty-one and sixty, and 7 were sixty-one or older. The youngest was sixteen and the oldest seventy-one.

As to schooling, 197 patients had not gone beyond the eighth grade, 156 had completed high school and 29 college.

Of the 382 patients, 83 (21.7 per cent) were sent to the hospital on a court order under a specific charge. Only 44 patients (14.0 per cent) were committed to other state hospitals, indicating that the majority of alcoholic psychoses cleared within the prescribed ten-day observation period.

Interesting information is to be obtained from a study of the physical and mental status of the various patients. There were 5 deaths (1.3 per cent), 2 in the delirium tremens group and 3 in the group designated as "alcoholic psychoses, other types." Two deaths were attributed to pneumonia, 1 to poisoning by bichloride of mer-

Table 3 *Varieties of Physical Disorder*

TYPE OF DISORDER	NO OF CASES
Peripheral neuritis	55
Hepatic disorder (including cirrhosis)	51
Bronchitis	45
Serologic syphilis	14
Lesions of midbrain and medulla	11
Convulsions (related to alcoholism)	10
Optic atrophy	6
Pneumonia	5
Pellagra	4
Testicular atrophy	4
Ulcer of the stomach	1

cury, 1 to cardiac decompensation accompanied by uremia and peripheral neuritis and 1 to circulatory collapse with delirium and exhaustion. Table 3 indicates the number of alcoholic patients with evidence of physical disorder of a specific type. It is evident that neuritis, hepatic disorder

(including cirrhosis) and bronchitis far outnumbered other complicating diseases. We ordinarily associate neuritis and hepatic disorder with excess intake of alcohol, and although these disorders were present in 14.0 and 13.0 per cent of all alcoholic admissions, respectively, it is surprising that some clinical evidence of these disturbances was not found in even more cases. Bronchitis was relatively frequent, while pneumonia was an uncommon complication. Only 2 patients died of pneumonia, while 3 recovered. This is to be considered fortunate, since, as is well known, alcoholic patients succumb to pneumonia much more readily than do non-alcoholic ones. Serological tests for syphilis were positive in 14 cases (3.4 per cent). The total admissions of patients with syphilis made up 8.4 per cent of the total hospital admissions for 1937, or more than double the proportion in the alcoholic group.

Eleven patients showed evidence of lesions in the midbrain or medulla, with cranial-nerve palsies, which in some cases remained only for a brief period, while in others the neurologic findings persisted. Alcoholic patients having cranial nerve palsies usually showed a mental syndrome consistent with the diagnosis of Korsakow's psychosis, or chronic deteriorative changes, with varying degrees of loss of memory and of behavior disorders. No pathologic material was available for study in this group, as there were no deaths. It seems reasonable to conclude, however, that in an alcoholic psychosis accompanied by cranial nerve palsies we were dealing with a pathologic process known as the superior poliomyelitis of Wernicke.

It is of interest that 10 patients had convulsive seizures, or what the alcoholic patient commonly refers to as "rum fits." These seemed to be definitely associated with excessive alcoholism, since they occurred only after heavy bouts of drinking. Although convulsions are a relatively uncommon complication of alcoholism, it is well to bear in mind that seizures do occur in this group without any demonstrable evidence of pathologic lesions that would explain the convulsion on some other basis.

Optic atrophy occurred in only 6 cases. It is difficult to say whether there was a direct causal relation between the alcohol and the atrophy. It is well known that methyl alcohol will produce such a change, and that it is seldom found in patients who drink ethyl alcohol. There was no way of ascertaining whether alcohol was primarily responsible for the optic atrophy or whether it was an incidental finding. The same thing was true of testicular atrophy, of which there were 4 cases. There were also 4 cases of alcoholic pel-

## DIAGNOSTIC TESTS

Diagnostic tests for early pregnancy have been sifted down to a clear acceptance of the Aschheim-Zondek (mouse) and Friedman (rabbit) tests as the most reliable. Either test, when done by reliable technicians, will give a positive reaction in 98 per cent of normal pregnancies,<sup>3</sup> and will give an equal ratio of negative reactions in patients who are not pregnant. No other test yet described, chemical or biological, approaches these two in accuracy. When, however, evidence is required in pathologic pregnancies as to the status of the fetus in utero, for example in estimating the prognosis for the child in threatened abortion, or in cases where intrauterine death of the fetus is suspected, these tests must be looked on with caution. For example, in a patient known to be pregnant who has shown some vaginal bleeding, a repeatedly negative test would indicate death of the entire ovum, both fetus and appendages, if, however, the test is positive it is so because of endocrine activity of the still functioning trophoblast or placenta, and this cannot be adduced as an indication that pregnancy will continue successfully. In hydatidiform mole, moreover, the test is characteristically strongly positive, and becomes so again even after clinically complete evacuation of the mole if chorion epithelioma ensues. Finally, in the case of suspected ectopic pregnancy, the test, though valuable as confirmatory evidence if positive, does not in any way rule out the diagnosis if negative, as early death and degeneration of the ovum is the rule in this condition.

In summary it may be said that while in normal pregnancies the Aschheim-Zondek and Friedman tests are of great diagnostic aid, especially before the clinical signs are unmistakable, in pathologic pregnancy the wise clinician will evaluate his test findings on the assumption that they indicate the presence or absence of functioning trophoblastic tissue, either in the uterus or elsewhere.

## METABOLISM AND NUTRITION DURING PREGNANCY

Much attention has been paid in the literature to the metabolic and nutritional aspects of pregnancy. The routine weight chart of the patient is quite as important a part of prenatal care as are the blood pressure and urinalyses. Evidence has been accumulated in increasing volume that attempts to control the weight of the fetus at birth by regulating the weight of the mother are only partially successful. On the other hand, excessive increase in maternal weight, especially during the last three months of gestation, often due to mild or even subclinical edema, is a valuable sign of the insidious onset of hypertension or albuminuria or both.<sup>4</sup>

Metabolism of minerals and vitamins has been the subject of numerous papers. The addition of iodine to the diet in the form of syrup of hydriodic acid, five drops every other day, is believed by some to be of value to the pregnant woman in the goiter areas of the country, by lessening the incidence of congenital goiter and cretinism in infants. Lugol's solution, given by rectum and subcutaneously, has been advocated in the treatment of certain cases of vomiting of early pregnancy in which an underlying hyperthyroidism may exist.

An adequate intake of calcium and phosphorus in the form of one quart of milk, a liberal helping of green, leafy vegetables and a serving of meat at one meal, with the addition to the diet of an egg per day, is ordinarily amply protective so far as the maternal supply of these elements essential to the fetus is concerned. During the early phases of pregnancy, when "physiologic" nausea is common, it may be impossible to induce the prospective mother to take a properly adequate diet. Fortunately, however, the fetal demands reach a peak during the last months of gestation, when dietary whims are much better controlled by advice and suggestion.

It is important at this point to consider vitamin D as the catalyzer of calcium and phosphorus metabolism. Since it is of scanty occurrence in most "natural" foods, many clinicians prescribe it in the form of cod-liver oil or viosterol in the routine diet of pregnant patients, in order to ensure an adequate supply of calcium and phosphorus both to the maternal teeth and to the fetal skeleton. It is claimed by some that the muscular cramps which are so common in pregnancy are relieved by viosterol or inorganic calcium or both. Since, however, no convincing evidence has yet been adduced either that the maternal dental structure requires these supplements, or that the infant will fail to receive its normal skeletal requirements if these additions to the mother's diet are not made, and since premature ossification has been reported in fetus and placenta following large doses of vitamin D in pregnancy, the situation as summarized by Stander<sup>5</sup> is worthy of repetition: "Should it be necessary, because of dietary deficiencies, inability to drink milk, or lack of sunshine, to supply compounds of calcium and phosphorus, and vitamin D, these must be administered with care, certainly in respect to vitamin D, as overtreatment may be as injurious as the deficiency itself."

There is very little belief at present that even in toxemic pregnancy the diet should be low in protein, in fact, a small group of toxemic patients with the nephrotic syndrome should have a liberal protein intake. To place a pregnant patient

patients having syphilis among the alcoholic group was notably less than that among admissions in general

The most frequent complications were neuritis, hepatic disorders and bronchitis, pneumonia rarely occurred. There were only 5 deaths (1.3 per cent). It is not readily explainable why more patients did not have neuritis or pellagra, as the diet was deficient in more cases than showed these disorders, and this fact seems to point to a marked individual variation of reaction to similar precipitating factors. Patients showing cranial nerve palsies invariably showed gross intellectual impairment, indicating extensive involvement of the higher brain centers.

Twenty-two per cent of the patients had been

admitted on previous occasions. Approximately the same number of patients in this series had had previous alcoholic psychoses without hospital admission. There was no correlation between the type of hallucination and the duration of the psychosis. The most frequently occurring visual hallucinations were those of dogs and insects. Lilliputian hallucinations and occupational delirium were unusually rare. The number of depressed and suicidal patients in this series is noteworthy and deserves a more thorough investigation. Homosexuality, either overt or latent, was discovered in surprisingly few patients.

The etiologic and precipitating factors of alcoholic excess are most complex, and it seems that no single explanation will fit all cases.

## REPORT ON MEDICAL PROGRESS

### MEDICAL ASPECTS OF OBSTETRICS

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THIS article presents a sabbatical survey (since 1932) of progress in those aspects of practical obstetrics which may fairly be denominated medical rather than surgical, and leaves for a complementary review those aspects of the specialty which are of importance from the surgical standpoint. Since editorial policy calls for information of the broader aspects of progress, tempered with critical comment, rather than for a meticulous review of current literature, the writer has avoided, so far as possible, quotations of chapter and verse in favor of a concentrated summary of various important subjects.

#### PHYSIOLOGY

From a practical aspect, rhythm as a means of promoting or inhibiting pregnancy can undoubtedly be used successfully by many couples for long periods. Several authors both in Europe and in America have published clinical tabulations of many thousands of copulations during the "safe" period with complete avoidance of undesired pregnancies. These figures, however, convincing so far as they go, do not answer the logical objections that the human race is not yet sufficiently disciplined to regulate its emotional urges by the calendar, that variations in the time of ovulation in the cycle may occur, as evidenced by unpre-

dictable prolongations of the estrin or corpus luteum phases, and that the possibility of induced coital ovulation as an unorthodox occurrence in human biology cannot be entirely disregarded.<sup>1</sup>

Sex regulation of human offspring seems, by analogy with animal genetics, to be linked with the sperm cell which fertilizes the ovum. A theory that relative alkalinity of the vagina at the time of intercourse results in a preponderance of male children has been advanced, suggesting the use of sodium bicarbonate by douching or instillation before coitus if the birth of a boy is desired. This theory, advanced in the German literature before the rise to power of the present chancellor, has subsequently, and possibly to the disappointment of *Der Fuhrer*, remained unsupported by other investigators.

Prediction of sex in the unborn child has been attempted by various biological methods. Most attention has been paid to acceleration of spermatogenesis in the testicles of three month-old rabbits following the injection into the test animal of urine from women in the second half of pregnancy.<sup>2</sup> Though the original investigators of the test reported successful prediction of sex of the child in 80 of 85 cases, later investigators were unable to obtain confirming results.

The two preceding paragraphs indicate that no reliable method has yet been devised either to regulate or predict the sex of the human infant.

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treatment of intercurrent infections and a close watch for the development of toxemic conditions. If this ideal is to be attained, each case should be followed by the internist and obstetrician, working in conjunction. Contrary to the theory that the pancreas of the fetus helps the maternal metabolism, experience seems to indicate that, in many cases at least, the diabetes becomes more severe during pregnancy, and requires a higher dosage of insulin for its control as pregnancy advances. The occurrence of hyperemesis in the first trimester may make control of the disease impossible, while during the last trimester, toxemia and eclampsia seem to be more frequent than in non-diabetic pregnancies. Despite improvement in the maternal risk, the fetal wastage is still higher than one would like to see it. Whether or not in the long run better fetal results will be obtained by routine abdominal section as soon as the infant is deemed viable,<sup>13 14</sup> or by reserving section only for over-large babies and ordinary obstetrical indications,<sup>15</sup> is still a controversial question.

#### PREGNANCY ASSOCIATED WITH CARDIAC DISEASE

It has been taught for many years on clinical grounds that the gravid state throws an extra burden on the circulatory system. Quantitative evidence obtained in the laboratory which has tended to rationalize this view is gradually being confirmed by observations made on living pregnant and parturient women. Thus, considering the finding that cardiac output rises to 50 per cent above the normal volume with advancing pregnancy, the finding that total blood and plasma volumes in the circulatory system also increase, and the frequency of rises in the systemic blood-pressure and pulse rate as gestation advances, no matter to what extent these processes are mutually causative, the increased burden on the circulation is evident.

That normal hearts and blood vessels adapt themselves to this strain is remarkable. That the damaged heart of the cardiac patient can bear this burden is often in doubt. The mere diagnosis of valvular heart disease does not give definite evidence of the organ's incapacity to withstand pregnancy, as many women with mitral stenosis or aortic regurgitation or a combination of the two may go through pregnancy and labor without any untoward event, some, on the other hand, have cardiac failure. Functional tests such as dumb-bell swinging, stair-climbing, and so forth, may reveal imminence of cardiac decompensation, but may give false assurance that the Class 1\* patient can reasonably be expected to stand the burden of

advancing pregnancy. It seems much more logical to believe with Hamilton<sup>16</sup> that the patient with a diastolic murmur, an unmistakable enlargement of the heart or both should be classed as an unqualifiedly bad risk for pregnancy if she has signs or history of decompensation, or if she has in addition auricular fibrillation, and to look upon her as a *relatively* favorable risk if fibrillation or signs or history of decompensation are absent, not, however, losing sight of the possibility that either of these conditions may arise despite strict medical supervision. A favorable cardiac case, classified on this basis, should have a 2 per cent mortality risk, an unfavorable case has been shown to have a 16 per cent risk, whereas one with auricular fibrillation courts a 33 per cent mortality.

Clinical evidence has accumulated that the peak load for the cardiac patient occurs toward the end of the sixth, during the seventh and at the beginning of the eighth month of pregnancy. Should the eighth month be passed without failure, the chances of decompensation during the ninth month or during delivery appear to be relatively small. Evidence has been adduced that the cardiac patient has neither a shorter and easier nor a longer and harder labor than the woman with a normal heart. The present trend is distinctly in preference of delivering favorable cardiacs through the pelvis at term, and of reserving abdominal section for those cases in which a purely obstetric indication exists.

The unfavorable cardiac, on the other hand, requires a different approach. She should, if contemplating pregnancy, be warned of the risk involved. If in early pregnancy, she should be allowed the option of abdominal abortion and sterilization. If, as often happens, she has started pregnancy as a favorable risk but later, because of decompensation, becomes unfavorable, the immediate treatment should be hospitalization, complete bed rest and intensive efforts to restore compensation. This regime, sometimes unavailing, is at best time-consuming, but often tides women over the seventh and eighth months, following which, with the peak load diminishing, the restored compensation allows a surprising proportion of these cases to be delivered safely through the pelvis.

In summary, it seems that the chief advances in the management of pregnancy complicating heart disease during the past seven years are largely the results of accurate classification of patients with seriously damaged hearts, the prognosis, according to classification, of the risks inherent in pregnancy and labor, and the relegation of abdominal section to a minor role in the obstetrical management of the favorable cardiac.

\*New York Heart Association and American Heart Association classifications.

on a meat-free diet is to invite the development of hypochromic anemia, and in certain cases to reduce the plasma proteins to an edema level. The ingestion of table salt, however, is a different matter, since an oversupply of the sodium ion, whether in the form of sodium chloride or of sodium bicarbonate, as taken immoderately by many women to combat flatulence and heartburn, tends to bind fluids in the tissues, thereby producing edema in the last trimester of pregnancy, when the ability of the kidney to excrete a highly concentrated urine is distinctly below normal.

The problem of vitamin adequacy in the diet of the pregnant woman has been widely discussed, and is still a somewhat controversial subject. For practical purposes a diet which contains milk, fruits and green and yellow vegetables each day and liver once or twice a week should be adequate for vitamin A, whole-wheat bread and whole-grain cereals will supply vitamin B<sub>1</sub>, liver, buttermilk and lean meat are good sources of vitamin B<sub>2</sub>, adequacy in vitamin C is assured by the daily ingestion of 6 to 8 ounces of orange juice, grapefruit juice or tomato juice. Vitamin D has been discussed above. Vitamin E is supplied by lettuce and wheat germ. Inadequacy of this substance has been claimed to result in abortion in the early months of pregnancy<sup>7</sup> and ablatio placentae in the last trimester,<sup>8</sup> and its routine administration in the form of wheat-germ oil has been advocated as a prophylactic against these conditions. The routine use of the substance, however, must be accepted with reservations, as the dosage is still empirical and the effects of overdosage are little if at all understood.

The hemoglobin content of the blood in pregnancy, especially in its latter half, is usually below normal. While this is undoubtedly due in part to the demonstrated increase in plasma volume which takes place at this time, it is nevertheless a fact that an actual anemia often occurs. This anemia has been postulated as due either to a direct dietary deficiency or to one conditioned by gastric anacidity, hypoacidity or associated defects, in the presence of fetal demand for blood-building material.<sup>9</sup> Microcytic (hypochromic) and macrocytic (hyperchromic) types have been described, the former occurring much more frequently than the latter. Ferrous sulfate, 9 to 12 gr daily, added to the diet is sufficient to combat hypochromic anemia, while liver or liver extract, with or without the addition of iron, controls the macrocytic or Addisonian-like type.

#### HYPEREMESIS GRAVIDARUM

While the etiology of hyperemesis gravidarum remains obscure, several points in the diagnosis

and treatment deserve comment. Toxic neuritis or neuronitis as a concomitant of prolonged or severe cases has been described, with a mortality of about 25 per cent in this group. Attention has been directed to the administration of vitamin B<sub>1</sub><sup>10</sup> by duodenal tube or parenterally, both prophylactically and therapeutically, in severe cases. Supra-renal cortex has also been advocated, but the original results on which this recommendation was based have not been repeated uniformly elsewhere. The administration of Lugol's solution by rectum or by the hypodermic route has been mentioned above. The procedure, however, of feeding fluids, calories and accessory vitamin factors B<sub>1</sub>, B<sub>2</sub> and C by duodenal tube has proved to have great value in severe cases, provided always that strict isolation of the patient from relatives and friends, preferably in a hospital, is observed.<sup>11</sup>

#### PREGNANCY ASSOCIATED WITH PULMONARY TUBERCULOSIS

Opinions still differ, as always, regarding the relative advisability of interrupting pregnancy in the tuberculous woman and of allowing the gestation to proceed to term. The general trend of thought is toward allowing the tuberculous gravida to continue in pregnancy, provided she has sanitarium observation and care or its equivalent, this is tantamount to ruling that the case be studied and cared for by the expert in tuberculosis, working in co-operation with the obstetrician. Pneumothorax in pregnant women is quite as feasible, if properly done, as in non-pregnant women, and recourse to this measure may enable many patients to go safely through pregnancy who could not otherwise do so. Floyd<sup>12</sup> seems to strike a sane middle ground in the management of the associated conditions when he advises the following measures:

For the case with healed or obsolete lesions, continuance in pregnancy under sanitarium precautions in the home.

For the case with early active lesions, the same with pneumothorax.

For the case with well-established tuberculosis, pneumothorax at once, otherwise therapeutic abortion.

For the advanced case with a poor prognosis from tuberculous standpoint, continuance in pregnancy for the benefit of the infant.

For the case with military infection, neither pneumothorax nor abortion, as neither procedure improves the prognosis.

#### PREGNANCY ASSOCIATED WITH DIABETES MELLITUS

Because of the control of diabetes by insulin, more diabetic women are able to conceive and bear children than was ever possible in the pre-insulin era. The essential factors in the successful management of such cases are close control of the diabetes by means of diet and insulin, the skillful

## PUERPERAL INFECTION

Certain important elements in the prophylaxis and treatment of puerperal septic infections deserve consideration

There has in the past few years been a marked stimulus to the obstetric conscience in the realization that the original focus of many cases of intrapartum as well as postpartum infection lies in the nasopharynx of an attendant. The idea is not new, and it has been frequently stressed since it was called to the attention of the profession in a clearly written article by Watson and his associates<sup>20</sup> in 1928. The presence of infectious organisms in the noses and throats of physicians, nurses and other hospital attendants is quite as common as in the population at large, and their insidiousness lies in the fact that no clinical symptoms may be present in the host. In other words, *everyone is a potential carrier*. As an obvious corollary, every person in attendance on a woman at delivery, and every nurse performing the perineal toilet of a postpartum patient, should, in addition to scrupulous care in digital asepsis, be effectively masked as to nose and mouth. In addition, every person known to be a carrier of the hemolytic streptococcus should be rigidly excluded from delivery or nursing care of the obstetric patient until such time as absence of the organisms is assured.<sup>21</sup>

The therapy of puerperal infection has been greatly advanced by the work of Colebrook and his associates in England, and by Long, Keefer and others in this country. The first-named group,<sup>22</sup> using Prontosil by oral, intramuscular and intravenous routes in 64 puerperal cases of infection with beta hemolytic streptococci, and later administering the allied substance sulfanilamide, usually by the oral route alone, to 100 other cases, were able to report a reduction in mortality in streptococcal infection from 23 per cent in the preceding five years to 5 per cent since early 1936. Keefer<sup>23</sup> reports that sulfanilamide used in treatment of puerperal sepsis due to streptococci prevents the local process from spreading, and inhibits invasion of the blood stream. In his experience in cases with bacteremia, with or without peritonitis or extensive thrombophlebitis, mortality has been reduced from 70 to 40 per cent.

A formidable amount of literature dealing with the effect of sulfanilamide on all types of streptococcal infections has appeared. Evidence indicates that the drug is bacteriostatic rather than bacteriocidal or antitoxic, and that its best effects are obtained in those cases which have some power of mobilizing an immune reaction against the invading organism.

Despite the fact that sulfanilamide provides

us with a potent therapeutic measure against the most dreaded agent of puerperal infection, a word or two of caution should be mentioned. Not all forms of sepsis are benefited; the drug is most active against the beta hemolytic streptococcus, but certain strains of this organism are resistant to its action, against the staphylococcus it has relatively little effect. Sulfanilamide therapy, to be effective, requires heavy dosage of the drug, with control determinations of the percentage level of the substance in the blood stream. Malaise and cyanosis are almost universal. The hemoglobin and red- and white-blood-cell counts should be determined at least every two days or better every day, because mild hemolytic anemia is common, and acute hemolytic anemia and agranulocytosis occur occasionally, as toxic manifestations. A fever due to the drug itself occurs in 9 per cent of the cases, according to Long,<sup>24</sup> and is an urgent indication for omission of the therapy.

It seems fair to conclude that the use of sulfanilamide in puerperal infection is an effective, though somewhat two-edged, measure. The physician prescribing it will be well advised to draw no conclusions concerning his results unless they are bacteriologically controlled, and unless they are obtained under the most scrupulous clinical observation, aided by adequate laboratory investigation.

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# HYPERTENSION AND ALBUMINURIA, EXCLUSIVE OF ECLAMPSIA

A survey of seven years reveals little if any progress in the discovery of a single background which suffices to explain the occurrence of these toxemic conditions. Claims have been made that a vicious cycle may be started in the second half of pregnancy by an oversupply of fluids to an individual whose renal capacity for water excretion is physiologically depressed, and that this cycle may proceed to a generalized edema which, acting on the central nervous system, may result in eclamptic convulsions and coma. The work of certain investigators pointing toward an etiology based upon increased activity of the posterior pituitary, through which they explain edema and oliguria by antidiuretic action of the hormone, and hypertension as the result of the pressor action of the same incretion, has not been confirmed by others. Retention of sodium ion resulting from an oversupply of sodium salts or from the inability of the kidney to excrete a concentrated urine has had its advocates as an important etiologic factor. Another endocrine background has been noted by investigators who find excessive amounts of prolactin in the blood, urine and placenta of toxemic patients, with a tendency toward a depression of the estrin level from the same sources. A recognized or unrecognized pre-existing pyelitis or pyelonephritis, it has been claimed, sets the stage for the subsequent development of toxemia during pregnancy. Finally, changes in the placenta, with infarction of this organ resulting in the elaboration of protein split products, such as guanidine, are looked upon by some as the causative factor. Strangely enough, very little is said concerning the ancient bugbear of nitrogen retention resulting from a diet supposedly too rich in protein.

From the standpoint of classification some progress has been made. Certain patients showing evidence of disease independent of pregnancy may be identified as having vascular hypertension, nephrosis or nephritis. Most cases, however, as first seen during pregnancy, give no history and yield no evidence of disease, so far as the physician can learn at first glance, independent of the pregnant state. These are divided into two categories: low-reserve kidney, according to the classification<sup>17</sup> of the Johns Hopkins Hospital, or pre-eclampsia, Grade 1, by the standards of the Boston Lying-in Hospital,<sup>18</sup> and pre-eclampsia (Johns Hopkins Hospital) or pre-eclampsia, Grade 2 (Boston Lying-in Hospital). The dividing line between the two is more or less arbitrary, and consists in the degree of hypertension or albuminuria or both, prodromal symptoms and signs suggest-

ing impending eclampsia are limited to the second group.

Despite the admitted uncertainty of the etiology of the toxemias of late pregnancy, and the numerous recently published studies of blood chemistry and renal function, certain basically important measures in the treatment of these conditions may be stated as within the scope of any physician who practices obstetrics.

Constant control of the pregnant patient by watchful interpretation of her symptoms and changes in her blood pressure, urine and weight.

Increased surveillance, even to hospitalization, should hypertension, albuminuria or both appear.

Salt poor or salt free diet, restriction of fluids by mouth, bed rest, moderate saline catharsis and strict watch for rising blood pressure or increasing albuminuria after the above signs appear.

Interruption of pregnancy should hypertension be unchecked, albuminuria increase or nervous symptoms suggesting impending convulsions appear after the above regime is instituted.

## ECLAMPSIA

This condition remains a "disease of theories." Both in its temporal relation to pre-eclampsia (Grade 2) and in its blood picture it is undoubtedly more closely allied to the latter condition than to nephritis, even though it often leaves impaired kidney function as a sequela after pregnancy has terminated. Closely allied though pre-eclampsia and eclampsia may be, it is important to recognize that the pre-eclamptic patient who becomes eclamptic exchanges a 25 per cent risk of death for one of 25 per cent,<sup>18</sup> hence the dictum that eclampsia is better prevented than cured.

Recent experience convinces us of several points in the treatment of this condition.<sup>19</sup>

Broadly speaking, the essence of a successful result lies in conservative treatment aimed at controlling the convulsions.

Conversely, immediate delivery by any means, above all by abdominal section (save in the rarest individual case), should be strongly deprecated.

Hospitalization and special nursing, if available, provide an environment more favorable than the home.

Morphine as a medication for control of convulsions may be better replaced by barbiturates administered by mouth or, in comatose patients, by rectum or intravenously, as an immediate or emergency measure.

Magnesium sulfate given intravenously, 20 cc. of a 10 per cent solution, will control the convulsion, and repetition of this dose to the extent of 60 to 80 cc. in twenty-four hours may be safely carried out if repeated convulsions occur or impend.

Frequent examinations or colonic lavage may excite further convulsions.

Hypertonic glucose solution given intravenously is advantageous in combating oliguria and anuria.

If labor ensues following convulsions, Nature has been kind. If the convulsions have been well controlled, induction of labor by rupture of the membranes is advisable.



showed marked weakness, slight cyanosis, nausea and vomiting. The vomitus gave a 3+ guaiac test. His blood pressure was 110 systolic, 90 diastolic. Moist rales were heard at both lung bases. Following a transfusion the patient seemed slightly improved, but the following day was weaker than ever. On the fourteenth hospital day respirations were shallow, the pulse weak and thready, the blood pressure 80 systolic, 50 diastolic, and the temperature 96°F. His condition rapidly became worse, his pulse and blood pressure were unobtainable, the fingertips became cyanotic, and respirations were labored. An oxygen tent, intravenous dextrose and other stimulants had little effect, and the patient died that afternoon.

#### DIFFERENTIAL DIAGNOSIS

DR. BERNARD M. JACOBSON. I do not believe that we can consider the generalized edema and ascites as due to heart failure on the basis of arteriosclerotic heart disease with congestive failure. He had no symptoms suggesting such a diagnosis and no physical signs referable to the heart. The question might be raised whether we could consider this nutritional edema either dependent on protein deficiency over a long period of time or due to a beriberi type of heart failure with generalized edema. Against these two rare possibilities is the fact that he is reported to be well nourished. Apparently he ate well during the month before admission, and there was no alcoholic history, polyneuritis or massive amount of protein in the urine. On the other hand, it seems to me that we have most of the evidence needed for a diagnosis of primary renal disease. We have a story of previous nocturia over a period of six to eight months and of generalized edema reinforced by a gain of 10 pounds in weight, in spite of not being up to par before entry. The principal findings consisted of generalized edema, marked ascites and possibly fluid in the pleural cavities. The laboratory findings were also consistent—a high specific gravity and massive amounts of albumin and many casts in the urine. The serum protein was low, and the serum cholesterol high, 317 mg. The rather low value for the serum chlorides, 85 milliequivalents, is not the rule in chronic parenchymatous nephritis with edema, but it does occur. We are not told whether the plasma bicarbonate was determined. We should expect it to be high if the chlorides were really low. Of course the chloride deficit in the blood might well depend on previous vomiting and poor chloride intake. The determination, however, was apparently not repeated.

On the day after admission two midline paracenteses failed to evacuate any fluid except a few blood tinged drops which might have come from

the edematous abdominal wall." I do not know how to explain that in view of the very definite physical findings of ascites.

"That night the right leg and arm suddenly became numb, the fingers of the right hand crossed and could not be moved, and he was unable to move his arm or leg." A very curious symptom which is not mentioned later in the record, so I assume that it disappeared in the course of a short time. It suggests carpopedal spasm, possibly due to some form of tetany. Was the tetany due to a calcium deficit in the blood? I do not believe so. It is not very usual to see so low an amount of ionized calcium in a person with marked renal disease. Could it have been due to high plasma-bicarbonate accompanying low blood chlorides? It is possible. I doubt whether it was a cerebral vascular accident because it cleared so rapidly.

We get no further information about the progress of the erythematous area on the right lower abdominal wall. One wonders whether it could have been erysipelas or an erysipeloid infection. One speculates as to whether there was a phlebitis. Since it is not mentioned again, I do not believe it warrants further consideration. With all these symptoms and physical signs, I do not see how we can get away from terminal cardiac failure, but I have already mentioned reasons why heart failure cannot be considered as the primary cause. Everything points to chronic renal disease as the background of the entire picture.

Of the types of renal disease this might be, certainly the commonest is chronic glomerulonephritis with edema—the nephrotic stage of chronic glomerulonephritis. It is rare to see such a marked number of casts in urine from a case of amyloid disease of the kidney. We have no history to suggest amyloid disease, and the only cases of idiopathic amyloid disease I have ever seen have had very definite signs of infiltration of the liver and spleen as well.

Is this myeloma involving the kidney, in view of the fact that the urine was examined for Bence-Jones protein? It seems unlikely. Is this acute glomerulonephritis? I doubt it. Against it is the lack of hypertension, the lack of very much sediment in the urine or very many red blood cells and the lack of a marked degree of nitrogenous retention in the blood. My diagnosis is chronic glomerulonephritis, with edema and terminal congestive heart failure.

DR. FRANCIS T. HUNTER. When I saw this man, very little laboratory work had been reported. He had a blood nonprotein nitrogen which was not very high—40 mg per cent—and had had three urine examinations. The lowest gravity of the

# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25051

### PRESENTATION OF CASE

A fifty-four-year-old married insurance agent entered complaining of abdominal swelling of two weeks' duration.

He was perfectly well until six or eight months before entry when he first noted weakness and lack of force in his urinary stream. There had been no dribbling or difficulty in starting or stopping the flow. Since then he had nocturia once each night. One month before entry he noticed swelling of his left leg which came on during the day and subsided at night. During the following week the edema gradually became generalized, involving the face and hands. Enlargement of the abdomen developed two weeks before entry. This gradually increased, causing respiratory embarrassment and a sensation of fullness in the chest. He had had chest pain, alternating from side to side on inspiration, without other symptoms during the previous winter, but had had no dyspnea or edema at any time before the onset of the present illness. No cough, sputum, anginal pains or palpitation had been noted. His urine had become somewhat hazy but there was no change in color. During the past two weeks he had been confined to bed and fed only liquid food. His appetite was good, and he had had no previous nausea, vomiting, malaise, chills or fever. His bowel movements had been regular and of normal color. After being confined to bed, however, he had had nausea and vomiting on two consecutive nights. The vomitus contained no trace of blood or bile. He had gained 10 pounds in weight. His past and family histories were noncontributory. He had had his gall bladder removed twenty-three years previously.

Physical examination showed a well-developed and nourished man having some difficulty in breathing. Pitting edema was present over the entire body. The tongue was coated. The diaphragms were high on both sides, but examination of the lungs was negative. The heart was not remarkable. The blood pressure was 130 systolic, 84 diastolic. There was marked abdominal distention, and tympanites with shifting dullness in the flanks. No tenderness was present,

and no masses could be palpated. There was an old cholecystectomy scar in the right upper quadrant.

The temperature was 97.8°F., the pulse 90, the respirations 20.

The urine was amber colored and acid in reaction, with a specific gravity of 1.034, a large trace of albumin, many hyaline casts and an occasional red cell and 3 to 5 white cells per high power field. The blood showed a red-cell count of 4,970,000, 90 per cent hemoglobin, and a white cell count of 15,500 with 90 per cent polymorphonuclears. The serum nonprotein nitrogen was 40 mg per cent, the protein 4.5 gm. The chlorides were equivalent to 85 cc N/10 sodium chloride. A blood Hinton test was negative.

X-ray films showed a large abdomen containing fluid. The right kidney outline was visible and not definitely abnormal, the left was not seen. The gas shadows in the bowel were not abnormal. There was no evidence of abdominal tumor. The diaphragm was high on both sides, particularly on the right. An area of density, apparently fluid, partially obscured the outline of the diaphragm and obliterated the right costophrenic angle. The left lung was clear. The heart and mediastinum were not remarkable.

On the day after admission two midline paracenteses failed to evacuate any fluid except a few blood-tinged drops which might have come from the edematous abdominal wall. That night the right leg and arm suddenly became numb, the fingers of the right hand crossed and could not be moved, and he was unable to move his arm or leg. He had fleeting pains in the left chest. These symptoms passed away within a few minutes, and he was again normal. On the fourth day his edema had increased and involved the right leg more than the left. Erythema appeared on the right leg and lower abdominal wall. The skin of these areas was very sensitive. Salyrgan and ammonium chloride therapy caused no diuresis. On the seventh day digitalization was begun. The urine showed no Bence-Jones protein. The serum nonprotein nitrogen was 40 mg per cent, and the cholesterol 317 mg. An electrocardiogram the following day showed a P-R interval of 0.2 seconds. There was no evidence of myocardial damage. Urine examinations during the next three days all showed a specific gravity of 1.016, a trace to a large trace of albumin and a rare red blood cell and 2 to 3 white blood cells per high power field. One specimen showed many finely granular casts. A stool was guaiac negative. The blood white-cell count was 11,100.

On the eleventh day the serum protein was 4.4 gm per cent. The following day the patient

is excreted through the kidneys. In the course of that process it apparently causes a considerable amount of irritation, and a large amount of hemoglobin is precipitated in the kidney tubules in the form of casts. These are so numerous that the hypothesis has been made that death is due to an intrarenal hydronephrosis—a complete blocking of the tubules with precipitated hemoglobin. I do not think that has been clearly proved, but on occasions the appearance of the kidneys suggests it.

DR. ALLEN G. BRAILEY: Should he not have had ascites?

DR. MALLORY: It is extraordinary that he did not have it.

DR. HUNTER: Did we not have a patient eight or nine years ago in his sixties with a lipoid nephrosis?

DR. MALLORY: Yes.

DR. HUNTER: But this is not lipoid?

DR. MALLORY: No, but the symptomatology is identical. There is no way to hypothesize clinically whether the tubular degeneration is going to be of the albuminoid type or of the lipoid type.

DR. HUNTER: The interesting thing about the urinary output was that the highest was 1500 cc., when he came in, with more or less tendency downward, and he was finally putting out about 900 cc., a little more than he was taking in.

DR. MALLORY: A very high specific gravity is characteristic of the disease.

DR. PALMER: Particularly because of the albumin?

DR. MALLORY: Yes.

## CASE 25052

### PRESENTATION OF CASE

A fifty-seven-year-old native housewife was admitted complaining of vaginal bleeding.

She had been perfectly well, and her menses had been normal and regular until ten years before admission, at which time she had an unruptured appendix removed. The right ovary and tube were removed at the same time because, she was told, of 'adhesions.' Fourteen days after the operation she developed an incisional hernia. However, she had complete amenorrhea until ten months before entry when spotting with bright red blood began. Six weeks after this bleeding started she entered an outside hospital, where a left ovarian cyst and part of the ovary were removed. The pathological report was papillary cystadenoma, without evidence of carcinoma. She was discharged well in fourteen days. About a month later she began bleeding again and a series of twelve x-ray treatments was given. After another month the

bleeding resumed and continued until entry. She had had no cramps, pain or weakness, though she had had occasional "dizzy and weak spells." She had lost 25 pounds in weight, from 200 to 175, during the year before entry. There were no gastrointestinal or urinary symptoms. She had had two children.

Physical examination showed an obese female in no distress. Examination of the lungs was negative. The heart was slightly enlarged to the left, and there was a rough apical systolic murmur. The sounds were regular and of good quality. The blood pressure was 205 systolic, 105 diastolic. The abdomen showed right rectus and left paramedian scars. On the right was a large incisional hernia. Vaginal examination showed a slightly enlarged uterus, there was protuse bleeding from the os. The uterus was movable. Nothing further was discovered by rectal examination.

The temperature, pulse and respirations were normal.

The urine examination showed a slight trace of albumin and 35 red cells and 20 white cells per high-power field. The blood showed a red-cell count of 2,700,000 with 55 per cent hemoglobin, and a white-cell count of 5700 with 61 per cent polymorphonuclears. The platelets were normal.

On the second hospital day an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR. LANGDON PARSONS: All this patient's trouble seems to date from her first surgical experience ten years before. One wonders about the initial diagnosis of appendicitis. There is nothing to show whether the appendix was diseased, but at any rate we go on to find that the right ovary and tube were removed. Apparently the appendix was not regarded as the sole cause of her symptoms. Whether the lesions of the tube and ovary were due to pelvic inflammation or endometriosis or anything you will, it is surprising that the other tube and ovary were not involved and likewise removed. Then after amenorrhea of ten years' duration she began to bleed bright-red blood and again entered a hospital for operation. Laparotomy was apparently done without curettage so we have no knowledge of what was going on inside the uterus. Evidently a mass was felt and proved to be ovary. The surgeon removed an ovarian cyst but only part of the ovary. There is little excuse for not removing all ovarian tissue in a woman of fifty-seven when laparotomy is done. Nothing was done about the uterus, probably for the reason that she was obese and hypertensive and regarded as a poor risk. With bleeding past the menopause, you are practically committed to do-

urine was 1 016, and the highest 1 034. It certainly did look like a nephrotic picture, but as I recall, some years ago we had an individual just like this who was given digitalis because it would not do him harm, and promptly lost all his edema. The question was brought up whether he ought to be transfused, despite a red-cell count of 4,900,000. I think it was right to rule out any possibility of cardiac failure first because, if he had had it, transfusion would have been the worst thing that one could have done for him. Subsequently the electrocardiogram turned out to be negative, and it was rather obvious in a short time that the cardiac situation played no part in his picture.

DR RICHARD CLARK: What did his prostate feel like?

DR HUNTER: I doubt if one could tell on account of the edema. He had the most amazing legs I have ever seen. They were covered with big patches of erythema. It was more like a cellulitis, almost ready to burst. The edema was worse in the dependent part of the body than higher up.

DR ROBERT S. PALMER: If this is a nephrotic phase of a glomerulonephritis, what happened to the red area in the abdomen? Such cases often die of some intercurrent infection.

DR TRACY B. MALLORY: At the time of autopsy there were none present. Erythemas often disappear post mortem.

#### CLINICAL DIAGNOSES

Chronic nephritis, nephrotic stage  
Congestive heart failure

#### DR JACOBSON'S DIAGNOSES

Chronic glomerulonephritis, nephrotic stage  
Congestive heart failure

#### ANATOMICAL DIAGNOSES

Acute nephrosis, albuminoid type  
Acute pulmonary edema  
Peripheral edema

#### PATHOLOGICAL DISCUSSION

DR MALLORY: The autopsy showed this very generalized edema which had been noted. The principal reason the abdominal taps were negative was that the peritoneum did not contain any ascitic fluid. The abdominal wall was extremely edematous and made the abdomen seem swollen. The pleural cavities were also dry, although the lungs were quite edematous. The heart was normal in size, the coronary arteries and adrenals were negative. The myocardium was normal. The significant positive finding was a pair of very much enlarged kidneys, weighing

500 gm. They were reddish, rather than yellow, but rather pale. When the capsule was incised the parenchyma bulged out over the capsule indicating that the cortex was quite swollen—it measured about 9 to 10 mm in thickness. On microscopic examination the glomeruli showed surprisingly little. He was, after all, in his fifties, and perfectly normal glomeruli could hardly be expected. There was a trace, perhaps, of thickening of the capillary walls here and there, but I am sure no more than the average man of fifty would be apt to show. In an occasional glomerulus one could find a few more leukocytes than usual but they were not very numerous, I do not believe we found more than 10 in any glomerulus. Although I can imagine a great deal of difference of opinion between histopathologists, I should say the glomeruli were essentially negative. The tubules, in contrast, showed an extreme grade of degeneration. All the cells of the convoluted tubules were greatly swollen and the fuchsinophil granules were frequently swollen to nine or ten times the normal diameter. It is the so-called albuminoid degeneration that is very characteristically seen in nephrosis. To find this type of kidney disease in a five- or ten-year-old child would not surprise me very much, but I have never before seen it in a fifty-four year-old man. It comes as near to pure nephrosis as I have ever seen. I do not know why he died. He was obviously not uremic. He unquestionably had some degree of infection but did not have a positive blood culture. The head was negative.

DR HUNTER: Perhaps the transfusion was bad for him.

DR MALLORY: At any rate it was not a "transfusion" kidney.

DR JACOBSON: Was there any lipid?

DR MALLORY: Practically none whatever. There were very slight deposits in an occasional tubule but not in the tubules that showed the most marked swelling and degeneration.

A PHYSICIAN: Was the carbon-dioxide combining power of the blood determined?

DR HUNTER: No.

DR THORNTON SCOTT: Was the pulmonary edema sufficient to cause death? He seemed to die a respiratory death.

DR MALLORY: There was certainly a considerable grade of pulmonary edema. His lungs were heavy, weighing 1600 gm. On the other hand, with fatal pulmonary edema the weight usually goes up to 2000 gm or more.

DR RICHARD CHUTE: What do you mean by a "transfusion" kidney? What does it look like?

DR MALLORY: If a mismatched transfusion is given, hemolysis is produced and the hemoglobin

DR. PARSONS We have seen another case in a woman of forty where the two were associated

DR. MEIGS Have you seen the association with any frequency, Dr. Smith?

DR. SMITH We have had two cases with adenomyosis and carcinoma starting in the adenomyosis without endometrial involvement

DR. MEIGS You mean carcinoma in the wall of the endometrioma? I have never seen it

DR. MALLORY Here I think it is clear that the carcinoma started in the endometrium itself, not in one of the more distant spots of endometriosis. We did have one case here, I remember, where we found an adenocarcinoma in the serosa of the sigmoid with a perfectly normal mucosa and muscularis overlying it, and we raised the question whether it might not have been carcinoma starting in an endometrial implant

DR. MEIGS It is well known that you can have carcinoma in the ovary apparently developing from an endometrioma, but I have never happened to see it in the uterine wall. It certainly occurs in the ovarian wall and I should think you might find it in the wall of the sigmoid when an endometrioma is there. The unaccountable thing in this case is the fact that they gave x-ray treat-

ment without knowing what was wrong inside the uterus in a woman fifty-seven years of age

DR. MALLORY Your inclination would be to believe that there was cancer there at that time?

DR. MEIGS Yes, I should think so

DR. PARSONS Carcinomas of the fundus are slow-growing and do not take on marked activity unless they have invaded through the wall of the uterus or extended to the adnexa. A history of bleeding for a year is still consistent with carcinoma

DR. MALLORY It could certainly last a long period of time. I remember one case where we made a diagnosis of atypical polyp of the endometrium but, since we could not exclude cancer, advised very careful following of the patient. She was lost track of for five years, then came back, and at that time had definite cancer, but the lesion was still only 2 cm in diameter and had not invaded the myometrium

DR. PARSONS Dr. Meigs has a patient known to both of us who, when told she had carcinoma of the fundus for which surgery was advised, replied "That is interesting because I was told the same thing ten years ago and nothing was done"

ing a total hysterectomy unless you can prove that there is nothing inside the uterus

This is a controversial point and I do not know whether Dr Meigs and Dr Mallory will back me up, but it has been my impression that an ovarian carcinoma does not cause bleeding past the menopause unless it involves the fundus of the uterus by extension of the disease or unless it is a hormone-secreting type which produces hyperplasia of the endometrium from which bleeding occurs. If that is true, this patient was probably not bleeding because she had an ovarian cyst, and removing the cyst and part of the ovary would not be expected to end the bleeding. The original pathological specimen was reported as papillary cyst adenoma, without evidence of carcinoma. We know papillary cyst adenomas of the ovary are borderline tumors, and there may have been some portions of the tumor which were malignant, so it is conceivable that there was extension of the tumor to the uterus to account for the bleeding. However, we must go on the basis of the original pathological report, at least for the time being, and assume that it was a non-malignant tumor. If that is true, we still have not explained the bleeding. In spite of that fact, a month later x-ray treatment was given to stop the bleeding. It is my impression that x-ray treatment will not control uterine bleeding in the absence of ovarian function. In other words x-ray treatment was given without knowing why the bleeding occurred and, to my mind, with little likelihood of controlling it.

I believe the bleeding was due to a carcinoma of the fundus, as a second choice, portions of the papillary cyst adenoma might have been malignant and the bleeding may have resulted from extension of the disease to the uterine fundus.

DR JOE V MEIGS To my mind the whole operative procedure was wrong. To think that a benign papillary cyst adenoma in one ovary was responsible for abnormal bleeding in a woman of fifty-seven is false reasoning. On the other hand, after looking up the cancerous lesions of the ovary in our hospital I believe some patients bleed from the endometrium who do not have extension to or hyperplasia of the endometrium. I have argued about this with Dr Parsons for a long time. It is my impression that with certain types of ovarian tumors the endometrium may be active even though it does not show signs of hyperplasia. Some of these tumors secrete enough hormone to stimulate the endometrium, but I have also seen patients with malignancy of the ovary who bleed from apparently inactive endometrium. Why, I do not know. Hence, I do not believe it is necessary to have a metastasis or

hyperplasia or even an active endometrium.

X-ray treatment should not be given to a woman fifty-seven years of age in whom a positive diagnosis as to the cause of bleeding has not been made. No one in this hospital would do it without investigating the inside of the uterus, particularly since we do not approve of x-ray treatment for postmenopausal uterine bleeding.

DR GEORGE G SMITH I agree with what Dr Meigs has said. Our experience has certainly been that it is possible to have ovarian tumors of various types, including cancer, that are associated with uterine bleeding, mostly slight in character, for which no definite cause can be found, although in some instances there is a mild degree of endometrial activity.

#### CLINICAL DIAGNOSES

Adenocarcinoma of uterus  
Fibroid?

#### DR. PARSONS'S DIAGNOSIS

Carcinoma of the fundus  
Extension of papillary adenocarcinoma of the ovary?

#### ANATOMICAL DIAGNOSES

Adenocarcinoma of the fundus of the uterus  
Endometriosis

#### PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY On this patient's entry into the hospital a curettage was performed preliminary to hysterectomy. From a frozen section the pathologist was unable to make a definite diagnosis, though he was suspicious of carcinoma. Since he could not exclude cancer a hysterectomy was urged. The uterus was removed with considerable difficulty because it broke in the operator's hands and he had to go back and remove the cervix secondarily. The uterus therefore arrived in the laboratory in two pieces, neither of which grossly showed any obvious tumor, but on microscopical examination it is quite clear that it contains two lesions which I have not happened to see associated before. There is a frank endometrial carcinoma, and there is also a very widespread endometriosis with a considerable number of foci deep in the wall of the uterus. In some fields it is almost impossible to decide whether one is looking at endometriosis or carcinoma or perhaps a mixture of the two. In fact among the islands of endometriosis that are clearly surrounded by endometrial stroma two types of glands may be found, one of which looks fairly normal whereas the cells lining the others have all the cytologic characteristics of malignancy.

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1 each in Rhode Island, Massachusetts, Vermont and Maine,—the present case being the fifth in New England and the second in Massachusetts. It has been pointed out in a previous editorial\* that the advisability of importing Western rabbits for restocking the depleted native rabbit population is open to serious question. It is true that such a practice has apparently not resulted in the infection of native rabbits in states, such as Connecticut and New York, where restocking has been carried out for several years. This and the absence of the spontaneously occurring disease in native rabbits may be explained by a low incidence of insect vectors—ticks, lice and fleas—in most sections of the northeastern states. The climatological conditions on Cape Cod are quite different,—closely approaching those in states, such as Maryland, where tularemia is of common occurrence,—and it is not unreasonable to predict that the introduction of Western rabbits there may eventually lead to a sharply localized area where the disease in rabbits and human beings is prevalent.

The prevention of tularemia is largely a matter of personal precaution. Sick or dead wild rabbits should not be handled. Rubber gloves should be worn by those who dress them and other wild animals, but even then, sharp fragments of bone can pierce the glove and puncture the hand. Tick bites in an infested area are potentially dangerous. Rabbit meat should be thoroughly cooked. If subsequent cases of tularemia are reported from Cape Cod, instructions as to the symptoms and methods of prevention of the disease must be widely publicized.

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## MASSACHUSETTS MEDICAL SOCIETY

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### SECTION OF OBSTETRICS AND GYNECOLOGY†

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

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#### POSTPARTUM HEMORRHAGE

Mrs. E. C., a twenty-four-year-old primipara at term, was admitted to the hospital on June 30,

1928, after the membranes had spontaneously ruptured. She was not in labor.

Her past history was essentially negative. Catamenia began at thirteen, were regular with a twenty-eight-day cycle, and lasted four days without pain. Her last period was October 1, 1927, making her expected date of confinement July 10.

She was first seen on May 8. Physical examination showed the heart not enlarged, and the sounds regular and of good quality. The lungs were clear and resonant, there were no rales. Her blood pressure was 124 systolic, 62 diastolic. The fundus was 27 cm. above the symphysis. Vaginal examination showed the cervix soft, the vertex presenting. Her pregnancy progressed normally until entry to the hospital.

On July 2, two days after the membranes had ruptured, she was given castor oil and quinine, which resulted in pains off and on during the day. At 10 p. m. the pains were coming every five minutes and she was given chloral and morphine, which quieted her down. On July 3 a rectal examination at 8 a. m. showed the head engaged and the cervix taken up and admitting one finger. At 2 p. m. the cervix admitted three fingers, but the pains were inconsequential. Soon after this she was etherized, and a vaginal examination made. The cervix was found to admit four fingers and was soft, the fetus was in an OLA position. A version was done without difficulty, and a male child weighing 6 pounds, 9 ounces, was delivered. A minor laceration was repaired routinely. The placenta was almost immediately expressed intact, with membranes complete.

Following the delivery of the placenta, there was a great deal of fresh blood and a large clot. The uterus remained contracted for about an hour and then relaxed. With each subsequent contraction there was considerable hemorrhage. Whereas at the end of the delivery her pulse was 100, it gradually rose to 130, her blood pressure went down to 60 systolic. She was somewhat pale and perspired freely. Oxytocics were given intramuscularly without benefit. (The use of intravenous injections of pituitary extract had at that time not become general.) Her blood was matched with that of her husband, and as he was compatible, she was transfused with 600 cc., followed by 400 cc. of saline. Her pulse came down to 110, her blood pressure rose to 98 systolic, and her general condition improved. The convalescence was uneventful, and she was discharged seventeen days following delivery.

*Comment.* This case occurred ten and a half years ago. At that time it was a common but not

\*Editorial, Tularemia, *New Eng. J. Med.* 216:764, 1937.

†A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

# The New England Journal of Medicine

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## UNPRECEDENTED!

THE annual New Year boasts and boosts of days gone by have ceased to concern themselves with our economic fabrics, the hoarse prophets in the market places are strangely silent. We sneak from one year to another fearfully harkening to the professional agitators and devoutly hoping that the cataclysm may be postponed another twelvemonth.

In this issue, the *Journal* presents what must be construed as the effect of society's kaleidoscopic impacts upon the health of its individuals. Somehow the bodily changes of fear, pain, hunger and rage have girded us as never before against bacterial invasions—particularly those of the respiratory tract. The death rates for tuberculosis, pneumonia and influenza have never before been so low in the United States. We do not recall that the physiologists ever made it clear that these bodily

changes lead to the exercise of greater caution or prudence, but it now appears that eleven thousand fewer people were killed in accidents of all kinds (eight thousand of them having escaped deaths in automobile accidents) in the United States during 1938. Possibly this may follow the lowered sensory thresholds and consequent quicker reflex responses which would be brought about by a more or less continuous stimulation of the adrenal cortex.

When the figures are broken down there appears one sad feature, smallpox, the disease which we have known how to prevent for a hundred and forty years, was unusually prevalent in the country at large. If compulsory vaccination against smallpox cannot be contrived one must wonder how effectively compulsory health insurance can be expected to assert itself under the Stars and Stripes, preventive medicine and human nature being what they are. Even these discrepancies however may serve a useful purpose by still further stimulating our natural supplies of adrenaline, and may thus bring about an even happier chart for 1939!

In all seriousness, this phenomenon must not be misinterpreted. The knowledge we have can only partially explain what is taking place. These accumulating values provide a potential bandwagon. Already we have seen them pointed to with pride by various groups. They must not be lightly interpreted, either by ourselves or others.

## TULAREMIA

TULAREMIA is not a major health problem in the United States, but the subject is interesting inasmuch as the majority of cases can be prevented by reasonable precautions. According to Dr. A. M. Stimson, in a release from the United States Public Health Service dated December 23, 1938, totals of 8000 cases and 396 deaths had been reported up to 1938, furthermore, 613 cases had been recorded in 1938 up to November 1, not including the figures from Illinois, Ohio, Virginia and Kentucky where, for the past twelve years, high incidences have occurred.

New England has been singularly free from the disease. As pointed out elsewhere in this issue of the *Journal*, only 4 cases have been recorded,—

Heart Disease The treatment of heart attacks' or 'cardiovascular emergencies'	February 23
Operative Obstetrics	March 2
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children.)	March 9
Gonorrhea Modern treatment of gonorrhea	March 16
Syphilis Latent syphilis—diagnosis and treatment	March 23
Bleeding in the Third Trimester of Pregnancy	March 30

Meetings to be held at the Morton Hospital, Thursdays, at 4 00 p m.

Lester E. Butler, M.D., *Chairman*

# BRISTOL SOUTH DISTRICT

Place FALL RIVER

SUBJECT	DATE
Gonorrhea Modern treatment of gonorrhea	February 7
Syphilis Latent syphilis—diagnosis and treatment	February 14
Medical Complications in Pregnancy	February 21
Whooping Cough The present status of vaccine therapy, both as prophylactic and therapeutic measures, the early diagnosis by laboratory procedures, and the treatment of complications	February 28
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 7
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 14
Heart Disease The treatment of heart attacks' or cardiovascular emergencies	March 21
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children)	March 28

Meetings to be held at the Union Hospital, Tuesdays, at 4 00 p m.

Howard P. Sawyer, M.D.,  
Robert H. Goodwin, M.D.,  
*Chairmen*

# FRANKLIN DISTRICT

Place GREENFIELD

SUBJECT	DATE
Heart Disease The treatment of 'heart attacks' or cardiovascular emergencies	March 8
Bleeding in the Third Trimester of Pregnancy	March 15
Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications	March 22
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 29
Sepsis	April 5

Syphilis Latent syphilis—diagnosis and treatment	April 12
Gonorrhea Modern treatment of gonorrhea	April 26
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	May 3

Meetings to be held at the Franklin County Public Hospital, Wednesdays, at 8 00 p m.

Halbert G. Stetson, M.D., *Chairman*

Note Because of the holiday, the course will be omitted April 19

# HAMPDEN DISTRICT

Places SPRINGFIELD, HOLYOKE

SUBJECT	DATE
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 2
Heart Disease The treatment of heart attacks or cardiovascular emergencies	March 9
Syphilis Latent syphilis—diagnosis and treatment	March 16
Gonorrhea Modern treatment of gonorrhea	March 23
The Indications and Contraindications for Removal of Tonsils and Adenoids	March 30
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	April 6
Bleeding in the Third Trimester of Pregnancy	April 13
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children)	April 20

Meetings to be held Thursdays at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, at 4 00 p m., and in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke, at 8 00 p m.

George L. Schadt, M.D., *Chairman*

# MIDDLESEX EAST DISTRICT

Place MELROSE

SUBJECT	DATE
Medical Complications in Pregnancy	February 7
Whooping Cough The present status of vaccine therapy, both as prophylactic and therapeutic measures, the early diagnosis by laboratory procedures, and the treatment of complications	February 14
The Indications and Contraindications for Removal of Tonsils and Adenoids	February 21
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	February 28
Gonorrhea Modern treatment of gonorrhea	March 7
Syphilis Latent syphilis—diagnosis and treatment	March 14
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 21
Heart Disease The treatment of heart attacks or 'cardiovascular emergencies	March 28

Meetings to be held at the Melrose Hospital (Colby Hall), Tuesdays, at 4 00 p m.

Walter H. Flanders, M.D., *Chairman*

universal practice to introduce a bag if labor did not follow rupture of the membranes within twenty-four hours. In this case it was not done. Today, when it is known that there is no pelvic disproportion, most men are indifferent to the early rupture of the membranes, because experience has taught that the great majority of such cases will start in satisfactory labor even if there is a delay of three to five days before the onset of labor. Occasionally such an occurrence does result in a prolonged, unsatisfactory labor, and any such patient may experience postpartum hemorrhage.

Version was done in this case because the head was not low, the cervix was not completely dilated, and satisfactory progress was not being made. The operation of version in primiparas must always be undertaken with an appreciation of its inherent dangers and should not be performed by one poorly trained in the art of obstetrics.

Apparently the placenta separated very soon after the birth of the baby and may have been partially separated before the baby was born. Evidence of this was the large clot and unusual amount of fresh bleeding which immediately followed the delivery of the placenta.

The periods of relaxation in this uterus were much longer than those of contraction, and there was apparently considerable bleeding during the former, which resulted in the loss of more blood than was normal. Transfusion not only replaced lost blood but, as so often happens, stimulated the uterus to contract. Neither the amount of bleeding nor the condition of the uterus made packing necessary. The excellent result following transfusion proved this to have been the correct procedure.

## LEGISLATIVE NOTES

The following bills before the Legislature are scheduled for a public hearing before the Committee on Public Health on February 9.

SENATE 258 Bill relative to the meaning of the terms 'rendering medical service,' 'practice of medicine,' et cetera.

HOUSE 59 Same as S 258

HOUSE 60 Bill relative to the annual registration of physicians.

HOUSE 985 Bill relative to doctors of medicine and doctors of osteopathy on the Board of Registration in Medicine.

HOUSE 986 Bill relative to a doctor of medicine and a doctor of osteopathy on the Approving Authority.

## POSTGRADUATE EXTENSION COURSES

The programs of instruction to be given this spring by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau are listed below. These courses are offered free to all legally registered physicians in Massachusetts.

### BARNSTABLE DISTRICT

#### Place HYANNIS

SUBJECT	DATE
Bleeding in the Third Trimester of Pregnancy	March 5
Heart Disease The treatment of heart attacks or "cardiovascular emergencies"	March 12
Syphilis Latent syphilis—diagnosis and treatment	March 19
Gonorrhea Modern treatment of gonorrhea	March 26
Cesarean Section, Analgesia	April 2
The Indications and Contraindications for Removal of Tonsils and Adenoids	April 9
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	April 16
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	April 23
Meetings to be held at the Cape Cod Hospital, Sundays, at 4 00 p m	

Donald E. Higgins, M.D., *Chairman*

### BERKSHIRE DISTRICT

#### Place PITTSFIELD

SUBJECT	DATE
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 9
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 16
Sepsis	March 23
Syphilis Latent syphilis—diagnosis and treatment	March 30
Gonorrhea Modern treatment of gonorrhea	April 6
Heart Disease The treatment of "heart attacks" or "cardiovascular emergencies"	April 13
The Indications and Contraindications for Removal of Tonsils and Adenoids	April 20
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children)	April 27

Meetings to be held at the House of Mercy Hospital, Thursdays, at 4 30 p m

Melvin H. Walker, Jr., M.D., *Chairman*

### BRISTOL NORTH DISTRICT

#### Place TAUNTON

SUBJECT	DATE
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	February 9
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	February 16

Heart Disease The treatment of 'heart attacks or cardiovascular emergencies	February 23
Operative Obstetrics.	March 2
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children)	March 9
Gonorrhea Modern treatment of gonorrhea	March 16
Syphilis Latent syphilis—diagnosis and treatment	March 23
Bleeding in the Third Trimester of Pregnancy	March 30

Meetings to be held at the Morton Hospital, Thursdays, at 4 00 p m.

Lester E Butler, M.D, *Chairman*

#### BRISTOL SOUTH DISTRICT

Place FALL RIVER

SUBJECT	DATE
Gonorrhea Modern treatment of gonorrhea	February 7
Syphilis Latent syphilis—diagnosis and treatment	February 14
Medical Complications in Pregnancy	February 21
Whooping Cough The present status of vaccine therapy, both as prophylactic and therapeutic measures, the early diagnosis by laboratory procedures, and the treatment of complications	February 28
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 7
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 14
Heart Disease The treatment of "heart attacks" or cardiovascular emergencies	March 21
The Control and Treatment of Respiratory Infections. (This is to include the serological treatment of pneumonia in infants and children.)	March 28

Meetings to be held at the Union Hospital, Tuesdays, at 4 00 p m.

Howard P Sawyer, M.D,  
Robert H. Goodwin, M.D.,  
*Chairmen*

#### FRANKLIN DISTRICT

Place GREENFIELD

SUBJECT	DATE
Heart Disease The treatment of heart attacks or "cardiovascular emergencies	March 8
Bleeding in the Third Trimester of Pregnancy	March 15
Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications	March 22
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 29
Sepsis	April 5

Syphilis Latent syphilis—diagnosis and treatment	April 12
Gonorrhea Modern treatment of gonorrhea	April 26
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	May 3

Meetings to be held at the Franklin County Public Hospital, Wednesdays, at 8 00 p m

Halbert G Stetson, M.D, *Chairman*

Note Because of the holiday, the course will be omitted April 19

#### HAMPDEN DISTRICT

Places SPRINGFIELD, HOLYOKE

SUBJECT	DATE
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 2
Heart Disease The treatment of heart attacks or 'cardiovascular emergencies	March 9
Syphilis Latent syphilis—diagnosis and treatment	March 16
Gonorrhea Modern treatment of gonorrhea	March 23
The Indications and Contraindications for Removal of Tonsils and Adenoids	March 30
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	April 6
Bleeding in the Third Trimester of Pregnancy	April 13
The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children)	April 20

Meetings to be held Thursdays at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, at 4 00 p m., and in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke, at 8 00 p m

George L. Schadt, M.D, *Chairman*

#### MIDDLESEX EAST DISTRICT

Place MELROSE

SUBJECT	DATE
Medical Complications in Pregnancy	February 7
Whooping Cough The present status of vaccine therapy, both as prophylactic and therapeutic measures, the early diagnosis by laboratory procedures, and the treatment of complications	February 14
The Indications and Contraindications for Removal of Tonsils and Adenoids	February 21
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	February 28
Gonorrhea Modern treatment of gonorrhea	March 7
Syphilis Latent syphilis—diagnosis and treatment	March 14
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 21
Heart Disease The treatment of "heart attacks or cardiovascular emergencies	March 28

Meetings to be held at the Melrose Hospital (Colby Hall), Tuesdays, at 4 00 p m.

Walter H Flanders, M.D, *Chairman*

## MIDDLESEX NORTH DISTRICT

Place LOWELL

SUBJECT	DATE
The Indications and Contraindications for Removal of Tonsils and Adenoids	February 9
Gonorrhea Modern treatment of gonorrhea	February 16
Syphilis Latent syphilis—diagnosis and treatment	February 23
Heart Disease The treatment of heart attacks or cardiovascular emergencies	March 2
Delivery and the Puerperium	March 9
The Toxemias of Pregnancy	March 16
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 23
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 30

Meetings to be held at St. John's Hospital, Thursdays, at 4 30 p m.

William S Lawler, M D, *Chairman*

## MIDDLESEX SOUTH DISTRICT

Place CAMBRIDGE

SUBJECT	DATE
Bright's Disease and Hypertension Evaluation of new therapy, diagnosis	March 7
Anemia Modern methods in diagnosis and treatment of blood dyscrasias	March 14
Heart Disease The treatment of heart attacks or cardiovascular emergencies	March 21
Medical Complications in Pregnancy	March 28
Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measures, the early diagnosis by laboratory procedures, and the treatment of complications	April 4
Operative Obstetrics	April 11
Gonorrhea Modern treatment of gonorrhea	April 18
Syphilis Latent syphilis—diagnosis and treatment	April 25

Meetings to be held at the Cambridge Hospital, 330 Mt. Auburn Street, Tuesdays, at 5 00 p m.

Alexander A. Levi, M D, *Chairman*

\* \* \*

## FACULTY

*Anemia* Chairman Dr William P Murphy Instructors Drs Greene FitzHugh, Clark W Heath, Chester S Keefer, George R. Minot and Maurice B Strauss

*Bright's Disease and Hypertension* Chairman Dr James P O'Hare. Instructors Drs Laurence B Ellis, W Richard Ohler and Robert S Palmer

*Heart Disease* Chairman Dr Paul D White. Instructors Drs Edward F Bland, Francis L Chamberlain, Wilfrid J Comeau, Marshall N Fulton, R. Earle Glendy, Ashton Graybiel, Burton E Hamilton, T Duckett Jones, Samuel A Levine, Benedict F Massell, Sylvester McGinn, Joseph H. Pratt, William D Reid, Howard B Sprague and Oliver H. Stansfield.

*Gonorrhea* Chairman Dr E Granville Crabtree. Instructors Drs Weston T Buddington, Fletcher H Colby,

Oscar F Cox, Jr, Roger C Graves, Sylvester B Kelley, George C Prather and Samuel N Vose.

*Syphilis* Chairman Dr E. Granville Crabtree. Instructors Drs William P Boardman, Rudolph Jacoby, C. Guy Lane and Francis M Thurmon

*Obstetrics* Chairman Dr Robert L. DeNormandie. Instructors Drs De Los J Bristol, Jr, Christopher J Duncan, M Fletcher Eades, A. Gordon Gauld, Thomas R. Goethals, Roy J Heffernan, James C Janney, M. V Kappius, Foster S Kellogg, Joseph W O'Connor, John Rock, Judson A Smith and Raymond S Titus

*Pediatrics* Chairman Dr Warren R. Sisson. Instructors Drs James M Baty, Allan M. Butler, Stewart H. Clifford, John Davies, Louis K Diamond, R. Cannon Eley, Carlyle G Flake, Joseph Garland, Harold L. Higgins, Charles I Johnson, Charles F McKhann, Edwin H Place, Clement A. Smith and Edwin T Wyman

MEDICAL POSTGRADUATE  
EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning February 6

## BRISTOL NORTH

Thursday, February 9, at 4 00 p m., at the Morton Hospital, Taunton Subject—Anemia Modern methods in diagnosis and treatment of blood dyscrasias Instructor Maurice B Strauss Lester E. Butler, *Chairman*

## BRISTOL SOUTH (Fall River Section)

Tuesday, February 7, at 4 00 p m., at the Union Hospital, Fall River Subject—Gonorrhea Modern treatment of gonorrhea. Instructor Oscar F Cox, Jr Howard P Sawyer, *Chairman*

## MIDDLESEX EAST

Tuesday, February 7, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Medical Complications in Pregnancy Instructor James C Janney Walter H Flanders, *Chairman*

## MIDDLESEX NORTH

Thursday, February 9, at 4 30 p m., at St. John's Hospital, Lowell Subject—The Indications and Contraindications for Removal of Tonsils and Adenoids Instructor Warren R. Sisson William S Lawler, *Chairman*

## DEATHS

CLARK—GEORGE S CLARK, M.D., of 12 Germain Street, Worcester, died January 27 He was in his eightieth year

Born in Hardwick, he graduated from Hitchcock Free High School and taught school for several years He received his degree from the Harvard Medical School in 1885 Dr Clark was a member of the American Medical Association and the Massachusetts Medical Society and had practiced medicine in Worcester for fifty seven years.

His widow, four daughters, a sister and two brothers survive him

**EMERY**—**WILLIAM H. EMERY, M.D.**, of 109 Warwick Street, Roxbury, died January 21. He was in his ninety-first year.

Dr Emery received his degree from the Harvard Medical School in 1870 and, in his younger days, was an associate of Dr Oliver W Holmes.

He was a member of the Massachusetts Medical Society and the American Medical Association.

**FERNALD**—**GUY G FERNALD, M.D.**, of Elm Street, West Concord, died January 26. He was in his seventy-fifth year.

Born in Wilton, Maine, he attended Wilton Academy, State Normal School, St. Johnsbury Academy and Dartmouth College and, in 1899, received his degree from the Dartmouth Medical School. He served his internship at Mary Hitchcock Memorial Hospital, Hanover, New Hampshire, and then joined the staff of the McLean Hospital at Waverley. In 1908 he went to the Massachusetts Reformatory Hospital at West Concord where he remained for twenty seven years. Dr Fernald served as principal in the boys division at the Perkins Institute for the Blind, disciplinarian at Friends School, Providence, and while at the reformatory organized the psychopathological laboratory.

He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, a son and two brothers survive him.

**SEGUR**—**WILLARD B. SEGUR, M.D.**, of Enfield, died January 27. He was in his seventy fourth year.

Dr Segur graduated from Phillips Andover Academy and Princeton University, and received his degree from Dartmouth Medical School in 1892. For many years he practiced medicine in the Quabbin Valley area and had been medical examiner of the fourth Hampshire district for the past twenty years.

He was a fellow of the American Medical Association and of the Massachusetts Medical Society.

His widow and a son survive him.

**WOODWARD**—**LEROY A. WOODWARD, M.D.**, of 5 High Street, Worcester, died January 22. He was in his fifty fifth year.

Dr Woodward attended the public schools in Pawtucket, Rhode Island, and later entered the Rhode Island College of Pharmacy, graduating in 1906. He graduated from Tufts College Medical School in 1914 and interned at the House of Mercy Hospital, Pittsfield, and the Worcester City Hospital. He was chief surgeon at the Harvard Private Hospital, Worcester.

He was a fellow of the Massachusetts Medical Society and the American Medical Association.

MISCELLANY

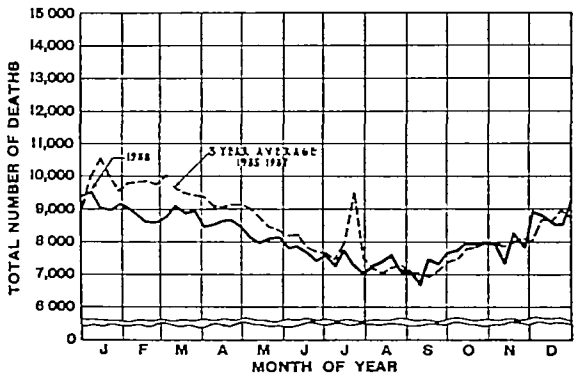
ANNUAL MORTALITY SUMMARY  
FOR 1938

Deaths in eighty-eight major cities during 1938 were 6 per cent under the 1937 figures, according to preliminary reports recently made public by Director William L. Austin, of the Bureau of the Census, Department of Commerce. The infant death rate in these cities was also slightly lower last year compared with 1937.

Deaths in the eighty-eight cities in 1938 totaled 424,189 compared with 449,555 reported for 1937, which is a decrease of 5.6 per cent. The provisional infant mortality rate for the eighty-eight cities is 43 per 1000 live births, compared with 47 in 1937.

The weekly death totals reported in 1938 were consistently lower than the average totals for the preceding three years from January to July, inclusive. During the rest of the year, however, the 1938 weekly totals were closely similar to the averages of the preceding three years.

The more favorable mortality record of 1938 as compared with the average of the preceding three years is due, probably, to the smaller number of deaths from in-



Total Deaths by Weeks in Eighty Eight Major Cities of the United States

fluenza and pneumonia during the winter and to the less extreme heat conditions during the summer.

The 27,147 infant deaths reported for 1938 represent a decrease of 1598, or 5.6 per cent, from the 28,745 reported for 1937. On the basis of estimated number of births, there were, in 1938, 43 infant deaths for each 1000 births. Although this figure is provisional, it indicates a real decrease in infant mortality when compared with the comparable provisional rate of 47 for 1937.

In the comparison of infant rates for different cities, certain considerations must not be overlooked. Primarily, the effect of differences in sex, age and racial composition of different cities must be evaluated before valid comparisons can be made.

RÉSUMÉ OF COMMUNICABLE DISEASES  
IN MASSACHUSETTS  
FOR NOVEMBER, 1938

DISEASES	NOV 1938	NOV 1937	FIVE YEAR AVERAGE*
Anterior poliomyelitis	0	6	16
Chickenpox	811	973	976
Diphtheria	21	8	43
Dog bite	666	598	540
Dysentery bacillary	9	37	68
German measles	30	39	61
Gonorrhea	421	569	544
Lobar pneumonia	233	269	300
Measles	597	282	482
Meningococcus meningitis	2	5	5
Mumps	257	266	347
Paratyphoid B fever	12	6	2
Scarlet fever	356	594	627
Syphilis	503	558	453
Tuberculosis, pulmonary	262	275	266
Tuberculosis other forms	30	24	28
Typhoid fever	6	15	8
Undulant fever	5	2	3
Whooping cough	558	471	758

Based on figures for preceding five years.

RARE DISEASES

Anthrax was reported from Somerville, 1, total, 1.

Diphtheria was reported from Boston, 1, Burlington, 1, Cambridge, 1, Gloucester, 1, Groveland, 1, Fall River, 3, Lawrence, 10, Medford, 1, Methuen, 1, North Andover, 1, total, 21.

Dysentery bacillary was reported from Amherst, 1,

Beverly, 1, Boston, 2, Danvers, 1, Lowell, 1, New Bedford, 1, Norwood, 1, West Springfield, 1, total 9

*Infectious encephalitis* was reported from Chelmsford, 1, Chelsea, 1, Foxboro, 1, Middleboro, 1, total, 4

*Meningococcus meningitis* was reported from Marblehead, 1, West Townsend, 1, total, 2

*Paratyphoid B fever* was reported from Lynn, 4, Medford, 1, Springfield, 2, Wellesley, 1, West Bridgewater, 3, Williamsburg, 1, total, 12

*Pellagra* was reported from Revere, 1, total, 1

*Septic sore throat* was reported from Boston, 5, Lawrence, 3, Marblehead, 1, Woburn, 1, total, 10

*Trachoma* was reported from Boston, 1, Fitchburg, 1, Worcester, 1, total, 3

*Trichinosis* was reported from Boston, 1, Fall River, 1, total, 2

*Typhoid fever* was reported from Boston, 1, Chelsea, 1, Holyoke, 1, Ludlow, 3, total, 6

*Undulant fever* was reported from Boston, 1, Brockton, 1, Dalton, 1, Fitchburg, 1, Millbury, 1, total, 5

Anterior poliomyelitis showed record low incidence. Measles and tuberculosis (other forms) were reported above the five year average.

Lobar pneumonia, pulmonary tuberculosis, mumps and diphtheria were reported below the five-year average. *Meningococcus meningitis* showed record low figures except for the years 1925 and 1934 which were equaled. Chickenpox, German measles and scarlet fever were reported below the five year average. Undulant fever showed record high figures except for the year 1936 which was equaled. Paratyphoid B fever was reported at a record high figure.

Animal rabies continued to show low incidence. New foci were noted in Newbury and Haverhill

#### "YOUR HEALTH" BROADCASTS

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eral, state and municipal public health departments, city hospitals, state favored private medical services and organizations, physicians holding more than one paying position, not to mention all the various cults, commercial quackery, counter-prescribing by druggists, self treatment and, last but not least, a poor and inadequate social service to investigate each case which applies for free treatment.

The doctor cannot solve his problem by evading the issue or romancing about it. He must face the realities of economic and medical life. The prevailing general economic conditions of depression have still more accentuated the sad state of the doctor. The doctor must organize properly to meet conditions as they now exist with his fellows and, if need be, apply liberal or even radical remedies, because the powers to be of the American Medical Association together with those physicians holding key positions, fear the loss of their prestige and therefore are not interested, or at least do not show it, taking in consideration what they say and even write with their pens, to help the physician and see to it that no physician is starving. I might say here that there are many physicians, yes thousands or more, who find it very difficult to pay rent, forgetting about meeting the ordinary everyday necessities of life, due to no fault of their own but for causes as stated before. The day of so-called "rugged individualism" is gone forever and has left "ragged individuals."

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Beverly, 1, Boston, 2, Danvers, 1, Lowell, 1, New Bedford, 1, Norwood, 1, West Springfield, 1, total 9

*Infectious encephalitis* was reported from Chelmsford, 1, Chelsea, 1, Foxboro, 1, Middleboro, 1, total, 4

*Meningococcus meningitis* was reported from Marblehead, 1, West Townsend, 1, total, 2

*Paratyphoid B fever* was reported from Lynn, 4, Medford, 1, Springfield, 2, Wellesley, 1, West Bridgewater, 3, Williamsburg, 1, total, 12

*Pellagra* was reported from Revere, 1, total, 1

*Septic sore throat* was reported from Boston, 5, Lawrence, 3, Marblehead, 1, Woburn, 1, total, 10

*Trachoma* was reported from Boston, 1, Fitchburg, 1, Worcester, 1, total, 3

*Trichinosis* was reported from Boston, 1, Fall River, 1, total, 2

*Typhoid fever* was reported from Boston, 1, Chelsea, 1, Holyoke, 1, Ludlow, 3, total, 6

*Undulant fever* was reported from Boston, 1, Brockton, 1, Dalton, 1, Fitchburg, 1, Millbury, 1, total, 5

Anterior poliomyelitis showed record low incidence. Measles and tuberculosis (other forms) were reported above the five-year average.

Lobar pneumonia, pulmonary tuberculosis, mumps and diphtheria were reported below the five year average. *Meningococcus meningitis* showed record low figures except for the years 1925 and 1934 which were equaled. Chickenpox, German measles and scarlet fever were reported below the five-year average. Undulant fever showed record high figures except for the year 1936 which was equaled. Paratyphoid B fever was reported at a record high figure.

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## WEST ROXBURY MEDICAL ASSOCIATION

A meeting of the West Roxbury Medical Association will be held in Highland Hall, 1868 Centre Street, West Roxbury, on Tuesday, February 7, at 8 30 p m

## SYMPOSIUM ON HEADACHE

Eyes Dr Benjamin Sachs  
Nose and Throat Dr Josiah Quincy  
General Medicine Dr Norman Welch  
Neurological Aspects Dr Maxwell MacDonald.  
Collation

DAVID L. LIONBERGER, M D, *Secretary*

## UROLOGICAL CONFERENCE

A urological conference will be held at 12 o'clock noon on the first and third Fridays of February, March, April and May in the Lower Out Patient Amphitheater of the Massachusetts General Hospital.

AMERICAN BOARD OF OBSTETRICS  
AND GYNECOLOGY, INCORPORATED

The general oral, clinical and pathological examinations for all candidates, Part 2 examinations (Groups A and B), will be conducted by the entire board, meeting in St. Louis, Missouri, on May 15 and 16, immediately prior to the annual meeting of the American Medical Association. Notice of time and place of these examinations will be forwarded to all candidates well in advance of the examination dates.

Candidates for re-examination in Part 2 (Groups A and B) must request such re-examination by writing the secretary's office before April 1. Candidates who are required to take re-examinations must do so before the expiration of three years from the date of their first examination.

The annual dinner meeting of the board, to which all diplomates and candidates are invited, as well as their wives and others interested in the work of the board, will be held at the Congress Hotel, St. Louis, on Wednesday evening, May 17, following the close of the examinations.

Application for admission to the Group A examinations must be on file in the secretary's office not later than March 15. Application blanks and booklets of information may be obtained from Dr Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

## TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10 00 to 12 30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium of high-voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

MEDICAL CLINIC AT THE PETER BENT  
BRIGHAM HOSPITAL

At 3 30 p m on Thursday, February 9, in the amphitheater of the Peter Bent Brigham Hospital, Dr C Sidney Burwell, research professor of clinical medicine and dean, Harvard Medical School and physician, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.

## TEMPERATURE SYMPOSIUM

A symposium on "Temperature and Its Measurement in Science and Industry" will be held under the auspices of the American Institute of Physics, probably next fall, the dates to be announced later. Consistent with the title, the symposium will broadly cover many fields, its primary purposes according to present plans being to (1) co-ordinate the treatment of the subject in the sciences and branches of engineering, (2) review principles and bring up to date the record of recent work, (3) accumulate contributions for a comprehensive text, to be published as soon as possible after the symposium is held, (4) reveal the subject as an important branch of physics and (5) supply schools with the information required for the improvement of curricula. The Institute confidently expects that a stimulating, valuable and unified program will be arranged, an aim which will require the help of many contributors.

A representative steering committee has been formed consisting of the chairman, C O Fairchild, director of research, C J Tagliabue Manufacturing Co, Dr E F DuBois, medical director, Russell Sage Institute of Pathology and professor of medicine, Cornell University Medical College, Dr Gustav Egloff, director of research, Universal Oil Products Co, Dr John Johnston, director of research, United States Steel Corporation, Dr W G Whitman, head, Department of Chemical Engineering, Massachusetts Institute of Technology, and Dr H A Barton, director, American Institute of Physics.

Those who are interested in taking part in this symposium should communicate with the Institute at an early date, giving information regarding their field of work and the subject of the contribution they wish to make. Such contributions will be co-ordinated with the subjects of a group of invited papers, and assignments and divisions made. Further information for contributors will be available shortly. Address all communications to American Institute of Physics, 175 Fifth Avenue, New York City.

## HARVARD MEDICAL SCHOOL LECTURES

The following lectures will be given in Amphitheater C of the Harvard Medical School at 5 p m

February 9—Lecture on the Care of the Patient. Dr Donald Guthrie of Sayre, Pennsylvania  
February 16—George W Gay Lecture on Medical Ethics. Dr Robert L. DeNormandie.

## SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, FEBRUARY 6

## MONDAY FEBRUARY 6

4 p m Physicians and medical students are cordially invited to attend a clinic presented by the medical surgical and orthopedic services of the Infants and Children's hospitals in the amphitheater of the Children's Hospital.

## TUESDAY FEBRUARY 7

9-10 a m Joseph H Pratt Diagnostic Hospital. Diagnosis of Certain Shoulder Conditions. Dr J D Adams.

10 a m 12 30 p m Tumor clinic Boston Dispensary.

11 30 a m John T Bottomley Society. Carney Hospital.

8 p m Robert B Brigham Hospital.

8 15 p m Greater Boston Medical Society. Beth Israel Hospital.

## WEDNESDAY FEBRUARY 8

9-10 a m Joseph H Pratt Diagnostic Hospital. Hospital case presentation. Dr S J Thannhauser.

12 m Clinicopathological conference. Children's Hospital Amphitheater.

12 m Boston City Hospital. Clinicopathological conference. Pathological Amphitheater.

2 p m New England Dermatological Society. Massachusetts General Hospital.

## THURSDAY FEBRUARY 9

- 8:30-9:30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Surgical
- \*9:10 a m Joseph H Pratt Diagnostic Hospital The Present Status of Vitamin B Dr L. R Weiss
- 3:30 p m Medical clinic at the Peter Bent Brigham Hospital
- 5 p m Lecture on the Care of the Patient Harvard Medical School Amphitheater C

## FRIDAY FEBRUARY 10

- \*9:10 a m Joseph H Pratt Diagnostic Hospital Recent Studies on Gout Dr J H Talbott
- 10 a m 12:30 p m Tumor clinic Boston Dispensary

## SATURDAY FEBRUARY 11

- \*9:10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- 10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY FEBRUARY 12

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Surgical Diseases of the Liver and the Bile Passages Dr Franklin G Balch Jr
- 4 p m Free public lecture, Harvard Medical School Amphitheater of Building D Asthma and Hay Fever Dr Henry N Pratt

\*Open to the medical profession

FEBRUARY 3—Urological Conference. Massachusetts General Hospital Page 218

FEBRUARY 5—Lecture at the Faulkner Hospital Page 971 issue of December 15

FEBRUARY 5—Free Public Lecture Harvard Medical School Page 1056 issue of December 29

FEBRUARY 5—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29

FEBRUARY 5—Salem Hospital Public Health Lecture Page 126 issue of January 19

FEBRUARY 7—John T Bottomley Society Page 217

FEBRUARY 7—Lawrence Cancer Clinic Page 173 issue of January 26

FEBRUARY 7—Robert B Brigham Hospital Page 125 issue of January 19

FEBRUARY 7—Greater Boston Medical Society Page 217

FEBRUARY 7—West Roxbury Medical Association Page 217

FEBRUARY 8—Boston City Hospital Clinicopathological Conference Page 217

FEBRUARY 8—New England Dermatological Society Page 217

FEBRUARY 9—Medical Clinic Peter Bent Brigham Hospital Page 218

FEBRUARY 9—Lecture on the Care of the Patient Page 218

FEBRUARY 9—Pentucket Association of Physicians 8:30 p m Hotel Bartlett, 95 Main Street Haverhill

FEBRUARY 16—George W Gay Lecture on Medical Ethics Page 218

FEBRUARY 17—Urological Conference. Massachusetts General Hospital

FEBRUARY 22—Alumni Day New York University College of Medicine. Page 173 issue of January 26

MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8.

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19

MARCH 27 31—American College of Physicians Page 36 issue of July 7

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 15-16—American Board of Obstetrics and Gynecology Inc Page 218

MAY 15 19—American Medical Association St. Louis Missouri

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24

FALL 1939—Temperature Symposium Page 218

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

FEBRUARY 8—Essex Sanatorium Middleton Clinic at 5 p m Dinner at 7 p m Speaker: Dr Edward Churchill Subject Surgical Treatment of Pulmonary Suppuration

MARCH 1—Lynn Hospital Clinic at 5 p m. Dinner at 7 p m Speaker Dr John Rock Subject Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m Dinner at 7 p m. Speaker Dr Ethan Allan Brown Subject Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

## WORCESTER

FEBRUARY 8—Page 173 issue of January 26

MARCH 8—Worcester Memorial Hospital

APRIL 12—Worcester Hahnemann Hospital

MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6:30 p m which is followed at 7:30 p m by the business and scientific sessions

## BOOK REVIEWS

*Cranio-Cerebral Injuries Their diagnosis and treatment*  
Donald Munro 412 pp London, New York and  
Toronto Oxford University Press, 1938 \$4.00

Dr Donald Munro, surgeon-in-chief for neurological surgery at the Boston City Hospital, has long been interested in injuries to the central nervous system. His large clinic, from which he reports over 1000 cases, has been a source of intensive study on the results of cerebral trauma. In addition, in associated departments of the hospital, experimental work has been carried forward which has added to our knowledge of intracranial pathology. The book, in review, is a personal report of the patients observed by him and the deductions drawn therefrom. The literature surveyed, in addition to his own publications, is largely, although not entirely, that emanating from the Boston City Hospital. This, however, should not detract from the value of the publication for it is Dr Munro's experiences and the conclusions which he has drawn from them that are of value.

The subject is extensively covered. Beginning with the fundamentals of cerebral physiopathology, the author considers the important questions of history and examination of patients, roentgenology, general principles of treatment, operative and non-operative treatment, complications of craniocerebral injuries, the complications due to necessary treatment, first aid, convalescent care and a general survey of his mortality and morbidity statistics. In addition, there is a chapter on craniocerebral injuries in the newborn.

In the opinion of the reviewer, no book covers the subject as well as this one. It is a practical, straightforward account of what has often been considered a field of great uncertainty. With the increasing number of automobile accidents, surgeons are forced, more and more, to handle patients with injuries of this type. Should they follow the outline set down by Dr Munro, their results, provided they have equal technical skill in operation, should be greatly improved over the results of a decade ago. There are, moreover, many practical hints for the general practitioner, who is the one that usually sees patients of this type first. The author stresses the importance of getting the patient to a hospital as soon as possible and of combating surgical shock before particular attention is given to the intracranial injury. As he states, if a patient cannot be moved or surgical shock is such that it becomes a serious factor, the patient is unlikely to survive even if operated on later. The value of absolute rest, the avoidance of early roentgenological examination, lumbar puncture, intravenous medication and intracranial operation are all considered in turn. One of the most

important parts of the book is the chapter on subdural hematomas, a traumatic condition which is often overlooked by general practitioners

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## AN EPISODE IN MASSACHUSETTS IN 1818 RELATED TO THE TEACHING OF ANATOMY

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THE recorded history of the study and teaching of anatomy in the United States began at Ipswich, Massachusetts, where, before 1647, was "made an anatomy for we never had but one Anatomy in the Countrey which Mr Giles Firmin did make and read upon very well"<sup>1</sup> In the seventeenth century "to make an anatomy" meant to complete a human dissection, and "to read upon" meant to lecture Dr Giles Firmin (circa 1614-1697), educated at Cambridge (England) University, came to the colony in 1632. He began medical practice in Ipswich in 1638, but after a few years returned to England, where he became a prominent clergyman.<sup>2</sup>

About a hundred and seventy-five years after Dr Firmin "made his anatomy" at Ipswich there occurred in that part of the town known as Chebacco, which was set off in 1819 as the town of Essex, events that had some unusual features and which led indirectly to important promotions of medical education.

There was little teaching of practical anatomy in the colonial period, and that little was unknown outside the medical profession. Occasionally a preceptor with his pupils or a small group of physicians would dissect a body, but practical anatomy was unknown to the general public. In 1750 in New York City, Dr John Bard and Dr Peter Middleton dissected the body of an executed murderer.<sup>3</sup> They lectured over this dissection and there was some public disapproval. In 1754 William Hunter lectured on anatomy at Newport, Rhode Island, but it is not recorded that he exhibited dissections. There was no institutional teaching of anatomy until 1765. Therefore the question of dissection was not at all in the public mind, and there were no laws that provided material for the practical study of anatomy.<sup>11</sup> In colonial New England there were also no specific laws against the disturbance of graves.<sup>4</sup>

The founding of two colonial medical schools, in Philadelphia and in New York, and of the first medical school of the national period in Cambridge were in each case immediately preceded by courses in anatomy. Since institutional medical instruction was inaugurated by instruction in anatomy, that subject became in the public mind a salient feature of a medical school. Anatomy implied dissection, and since there were no legal provisions for securing bodies to dissect, a suspicion arose that establishment of a medical school would necessarily be accompanied by the disturbance of graves. The establishment of medical schools therefore brought the subject of grave-robbing into the public mind in the early national period. The practice was in such disrepute that at times mob action resulted, and two series of laws were passed. One series incidentally provided an extremely meager supply of material for dissection. In the other series appeared a vigorous legislative program to prohibit the disturbance of graves. The citations below of examples of these legislative actions are restricted to New England, but similar action was taken in other states where medical schools were established.

In 1784, there was passed in Massachusetts an "Act against Duelling." It provided that the body of one killed in a duel should be turned over to any surgeon who might apply for it to be dissected. In the absence of such request the body was to be buried in the most public highway near the scene of the duel, without a coffin and with a stake driven through the body.<sup>5, 6</sup> Thus dissection was made equivalent to the most disreputable burial that could be devised. Incidental to this attempt to stop dueling the law provided the first legal dissecting material in New England. The first lectures in Harvard Medical School were in the autumn of 1783, so that in its second year this school, theoretically, could provide legal instruction in practical anatomy, provided someone engaged in a duel

\* Professor of histology and embryology, School of Medicine, Western Reserve University, Cleveland, Ohio.

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catalogues stressed the use of charts and models in teaching anatomy, and in some cases dissection was not mentioned. When mentioned it was only to say that there was opportunity for such as desired to dissect. Many medical students depended upon their preceptors, rather than upon the medical school, to teach practical anatomy, and by the preceptors it was usually poorly taught.

The matter of dissecting material affected medical education and medical students in many ways. In several cases faculty dissension, which resulted in the founding of rival medical schools, first began over the question of defense or condemnation of students involved in a resurrection. By the laity every medical student was considered a potential, if not an actual, grave robber, and was considered of lower morality than students in other educational institutions. Medical students were inclined to try to live up to this reputation, and were given to drinking to excess, profanity and public boisterousness. They were less welcome in polite society than law students, theological students or students of colleges of arts. The current popular opinion of medical students is shown in a novel published in Boston in 1846 in which the chief characters are medical students and the concurrent themes are body snatching and prostitution<sup>14</sup>. The author was a student in Harvard Medical School when he wrote this, the third of a long list of works of fiction that bear his name.

When from 1826 to 1832 the Clinical School of Medicine at Woodstock, Vermont, was denied a charter by the legislature, one of the arguments used by local opponents of the granting of the charter was that a medical school in that vicinity was undesirable because it would lead to the violation of graves in the cemeteries of neighboring villages. The records of debates in the legislature show that several members of the Assembly said that if another medical school were to be established in the state they wanted it as far as possible from their home towns<sup>15</sup>.

Mob action in connection with dissection arose from time to time. The first recorded in the United States was in New York City in 1788. A large mob attacked and pillaged a dissecting room, and raised havoc for two days until dispersed by military force.<sup>3</sup>

In April, 1830, the grave of a young woman at Barnard, Vermont, was discovered to be empty. A large party of citizens assembled and marched to the Clinical School of Medicine, then in its first session at Woodstock, ten miles distant. They searched the medical building but did not find the body. Nevertheless four students were arrested on suspicion. Two of these were released

after preliminary examination and the other two were remanded for trial. At Woodstock in June, a jury brought in a verdict of not guilty<sup>13</sup>.

Before daylight on November 29, 1830, about three hundred men of Hubbardton, Vermont, and surrounding towns gathered in that village and, headed by the sheriff of the county, marched five miles to the town of Castleton. Here they searched the building of the Vermont Academy of Medicine, a medical school in that town, and found the body of a recently interred woman whose grave in Hubbardton had been found empty. In 1879 was celebrated at Castleton what was supposed to be the fiftieth anniversary of the 'Hubbardton Raid'. The error in date was discovered after the anniversary had been arranged. On this occasion the local physician immortalized the stirring events of 1830 in an epic poem of nearly five hundred lines written in the style of *Hiawatha*, a unique item in American medical literature<sup>16</sup>.

Mob action connected with unauthorized disinterment was not confined to New England. In the autumn of 1839 a crowd from a neighboring town attacked the medical school at Worthington, Ohio. They found two bodies. Thereupon the leaders of the mob directed the faculty to load all the movable possessions of the school into wagons, whereupon an armed group accompanied the wagons and the faculty to the county line and warned them never to return. They never did. Thus ended the medical school at Worthington<sup>17 18</sup>.

In February, 1852, in Cleveland, Ohio, a mob attacked the rooms on the upper floors of a business block occupied by the recently organized Western College of Homeopathic Medicine. No bodies were found, but the mob destroyed all the equipment of the school, damaged the building and attempted to burn it. The wreckage was so complete that the school never reoccupied the premises<sup>19 20</sup>. Meanwhile at the Medical Department of Western Reserve College, a half-mile distant, in anticipation of a similar attack, eighty muskets and ammunition were secured from a neighboring armory. The white-haired dean, musket in hand, stood on the front steps of the medical building, with his armed students behind him awaiting the mob, which did not come when its scouts advised it of the preparations for its reception. Instead it started for the residence of the dean of the Western College of Homeopathic Medicine, intent on destroying his private property, and was stopped only when met by a company of militia that had been hastily called out.

These half-dozen events in different parts of the country show the public resentment against what

in which one or both parties were killed, but the rarity of duels made this source of supply negligible. Twenty years later the available supply was extended to the bodies of executed murderers.

The Massachusetts law of 1805 provided that "justices in case of murder committed in a duel shall, and in other cases may, at their discretion, further sentence and order the body of such convict to be dissected and anatomized."<sup>7</sup> Here is specific evidence that dissection was considered an additional posthumous punishment for major crimes. There were more hangings than duels, but the fact that judges were not compelled to assign the bodies of criminals for dissection tended to make such material extremely scanty,—only one or two bodies a year,<sup>11</sup>—and a surgeon who had private pupils was just as likely to get the body as was the professor of anatomy of the medical school. In some years, the Harvard Medical School secured only one body. When, later, legal dissection was extended to the bodies of convicts dying in prison, this disposition was at the discretion of the prison commissioners, depending, among other things, on the nature of the crime which the convict had committed. The first law of this type in New England was passed in Connecticut in 1824. Here again dissection was an additional posthumous punishment.

The resultant popular conception of dissection as an additional penalty for major crimes made the subject of anatomy odious. The laity felt that dissection of the body of a friend stigmatized his memory and made him, by implication, a criminal. This sentiment inhibited the securing of laws to designate bodies buried at public expense for the use of students of anatomy, for people believed that this would stigmatize as a criminal one who was merely poor or unknown.

An example of the influence of the establishment of medical schools on the other phase of the legislative program, namely the prohibition of grave robbing, is that, coincident with the decision of Dartmouth College to inaugurate medical teaching, a law was passed in New Hampshire in 1796 which provided a penalty of \$1000, public flogging not to exceed thirty-nine stripes or imprisonment for one year for disturbing a grave.<sup>8</sup> A similar law was enacted in Vermont in 1804.<sup>9</sup>

Public flogging as a penalty ultimately disappeared from the laws, and fine and imprisonment varied in different states from \$100 to \$3000 for each offense, or imprisonment varying from one to ten years. In Massachusetts in 1818 the penalty was a fine of \$1000 or imprisonment for one year. The law imposed the same penalty for possession of a disinterred body as for the actual disinterment, and possession was defined as presence of the body under control of an individual.<sup>10</sup>

The medical schools faced two alternatives either to abandon practical anatomy, since the sources of legally authorized material were insufficient to carry it on, or to conduct it with material secured by illegal methods. At the Harvard Medical School about 1810, "on account of the agitated state of the public mind concerning abuses in obtaining material for dissections, costly wax preparations were purchased to supersede the necessity of dissecting human subjects."<sup>11</sup> Officers of the medical schools tried in various ways to allay public agitation, which had brought prejudice against the medical school as an institution. One way was to attempt to persuade the local community, by proclamation, that the graves of families and friends were safe because material for dissection came from a distance. This argument was specious, certainly so before the era of railroads. Two examples of this method may be given.

At the Vermont Academy of Medicine at Castleton, 1824, the trustees passed the following resolutions:

Resolved by this corporation that no subject for use of this institution shall be taken from any graveyard or burying ground in the County, but such as may be necessary shall be procured from the great seaports of the neighboring States. Resolved that if any Student shall be guilty of violating the above Resolution, he shall be expelled from this Academy.<sup>12</sup>

This resolution was published in newspapers of the neighboring towns. In July, 1829, it was announced that the Clinical School of Medicine would open at Woodstock, Vermont, in the following March a published newspaper announcement, signed by the secretary of the faculty and school, contained the following:

We pledge ourselves to the community that we will not use or suffer to be used in any manner, so far as may come to our knowledge, any human body disinterred hereabouts — it may be invidious to set limits but we are willing to say the State of Vermont. We are well assured of obtaining a competency of the means from remote parts and in a manner that ever will be justified by the well informed and judicious part of the community.<sup>13</sup>

Because it was impossible to procure enough cadavers legally, the medical schools did not require dissection in the early nineteenth century, and in many schools not until late in that century. To do so implied a guarantee to furnish material which could be secured only by illegal methods. To make a requirement that implied law-breaking was likely to arouse public disapproval of medical schools, or even to endanger their charters. Therefore medical schools were careful as to what was said in print concerning dissection in connection with teaching, since medical school catalogues reached the laity as well as the profession. The

ber, 1819, a year and seven months after the discovery of the empty graves Daniel Davis, solicitor general of the Commonwealth, was attorney for the state and Daniel Webster for the defendant. The indictments charged that "Thomas Sewall did knowingly and wilfully receive, conceal, and dispose of the human body and remains thereof of one Sally Andrews" and "of one William Burnham." The charge was possession rather than disinterment. Dr Sewall was found guilty on both indictments, and was fined \$400 and costs in each case.<sup>27</sup>

Private resurrections are no longer practiced, since adequate anatomical laws have been enacted in all states, but this group of events, including the reburial of empty coffins and the proposed monument, constitute one of the most curious of the many public episodes connected with anatomical material. However, the interest in the events at Chebacco does not end with the trial of November, 1819, for there were two interesting sequels.

What of the man who was "largely fined"? Dr Thomas Sewall was born in Augusta, Maine, April 16, 1786, the son of a tanner. He studied medicine under a preceptor and began practice in Chebacco in 1808, succeeding his brother-in-law, Dr Reuben Dimond Mussey. For the session of 1810-11 Dr Sewall attended the Medical Department of the University of Pennsylvania, where Dr Mussey had recently taken his second medical degree. In 1811-12 Dr Sewall attended the Harvard Medical School and received the degree of doctor of medicine. In the year of his graduation he became a member of the Massachusetts Medical Society. He returned to his practice at Chebacco, where he served as preceptor for students. In 1813 Dr Sewall married an older sister of Rufus Choate, later famous at the Massachusetts bar.<sup>28</sup>

Immediately after his conviction Dr Sewall went to Washington, District of Columbia, far enough away so that the story of the resurrections at Chebacco would not be commonly known. At that time there was neither an arts nor a medical college in Washington. In 1821 Columbian College was organized, and in 1822 it began instruction in arts. Its plans included a medical school to be known as the National Medical College. In 1821 Dr Sewall was elected professor of anatomy in Columbian College.<sup>29</sup> At that time he had been in Washington less than two years, and had had no experience in medical teaching except as preceptor to students at Chebacco.\* One may infer that Dr Sewall's extensive study of

practical anatomy, and probably the teaching of it to his private students in Chebacco in the winter of 1818 had prepared him to accept such a professorship. He was the only professor of a medical subject appointed at that time. For four years he worked on the establishment of a medical college, and in March, 1825, this was opened under the name of the National Medical College, Medical Department of Columbian College, which soon took rank with the best American medical schools. Dr Sewall was truly its founder, and became its dean, holding this office for nineteen years. In the early years of his incumbency he was professor of anatomy and physiology, later professor of medicine.

The address which Dr Sewall delivered at the opening of this school was devoted to a review of medical education in the United States up to that time, and was the first comprehensive treatise of the subject, prior writers on medical education in this country having confined themselves to one or two institutions. The paper, which includes descriptions of medical schools and medical educators and some statistics, is the pioneer item in this country on the subject.<sup>29</sup> When Dr Thacher, three years later, published his *American Medical Biography*,<sup>3</sup> he included in the introduction a résumé of American medical schools much of which is taken from Dr Sewall's address.

Dr Sewall had a large and select practice in Washington. He wrote and published on several subjects besides medicine. He was considered an excellent teacher and administrator in medical education and a distinguished physician. He was an early advocate of national medical organization, but died April 11, 1845, at the age of forty-nine, a year before the American Medical Association was founded.<sup>28</sup>

It was as an indirect result of the resurrections in Chebacco Parish that a country doctor moved to the national capital, became its leading physician, founded the first medical school in that city and rose to national prominence in American medicine and medical education. It is an "ill wind that turns none to good."

Another series of events related to dissection had an indirect connection with the episode at Chebacco. In the *Essex Register* of Salem of May 9, 1818, appeared an editorial which began as follows:

The great alarm at Chebacco has made the subject of disturbing the dead a very serious concern. Something must be done to render the public mind quiet on the subject. Few who regard the living will be disposed to deny that the human system should be understood. To put beyond doubt the sufficiency of means and yet the safety of common graves the government must prevent the temptations to violate them.

\* It is possible that Dr Sewall was demonstrator of anatomy at the Harvard Medical School following his graduation but the available records of that period do not name the demonstrators of anatomy.

the laity called grave robbing or body snatching, but which those members of the medical profession versed in more elegant language termed "private resurrection" Attacks by mobs were not frequent, but search of a medical school by a sheriff was a frequent event These searches were usually without result, since every medical school had a place of concealment for the few cadavers which it might have on hand — few because cadavers were difficult to obtain, and because, when obtained, dissection was rapidly completed by a small group of students and the skeleton was removed One place of concealment was the cupola, an architectural feature of many early medical school buildings, not only ornamental but useful By block and tackle several cadavers could be quickly hoisted into the cupola through a trap door, whereupon the ladder by which the cupola had been reached could be hidden between the partitions of the building

The arrest of medical students, often including the demonstrator of anatomy, for suspected participation in resurrections was a common occurrence, but the records of conviction are few, and the penalty rarely exceeded a small fine

We shall now return to Ipswich, where Dr Firmin "made his anatomy" On the night of January 10, 1818, lights were seen in the hillside graveyard of Chebacco Parish<sup>25</sup> A diary, written in a neighboring town, shows that six inches of snow fell that night A snowstorm was a necessary adjunct of resurrection in winter if there was any snow on the ground, since only by falling snow were tracks obliterated The lights visible on the hillside must have been due to faulty technique, since lanterns used at resurrections were usually carefully shaded It was suspected that the grave of Sally Andrews, who had died on Christmas Day, had been disturbed When spring came and the snow disappeared her grave was opened and found empty Then suspicion arose that more than one grave had been disturbed, so all the graves of burials of that winter were opened and eight coffins were found empty In April the papers of Salem, the county seat twelve miles distant, carried the result<sup>21 22</sup> Newspaper accounts are abbreviated in a history<sup>23</sup> of the town written sixteen years later, as follows

Exhumation of the Dead. April 17, 1818 Great excitement prevails in Chebacco because it was discovered that no less than eight bodies have been taken from their graveyard. They adopt methods for detecting the person or persons concerned in the act. July 23 Mr Crowell preaches at the request of his people an interesting sermon on the occasion from John xx 13 The individual who was found to have disinterred these bodies for anatomical purposes was largely fined

A record<sup>25</sup> in another place shows that the eight people included three men, two women, two boys and a negro servant

At a parish meeting held on April 17 a committee was appointed to raise money as a reward "for discovering the author or authors of the late horrid deed" At a meeting on April 21 there is reference to "the empty coffins now lying exposed to public view" and to the appointing "of a day for the solemn reintering of said coffins in one grave in some conspicuous part of the burying ground" and "that a monument be erected over them by subscription with the names of the deceased whose bodies were stolen inscribed there on to perpetuate the memory of the horrid deed"<sup>24</sup>

An advertisement dated April 25 offering \$500 reward for information first appeared in the Salem papers on April 28 Its last appearance was on May 12, which probably indicates the approximate date of detection of the offender<sup>21 22</sup> This advertisement was signed by three prominent citizens of the parish A search of their genealogies shows that each of the three was either a parent, a brother or a son of one of those whose bodies were taken The eight empty coffins, which had been "exposed to public view" for over three months, were buried in a common grave on July 23, but on account of failure to secure funds the proposed monument was not erected On this occasion Mr Crowell preached a sermon which, as published, contains over twelve thousand words<sup>25</sup>

Mr Crowell's sermon has points of interest besides its length He said that dissection in itself was not unchristian This was not in accord with popular belief linking dissection and crime Inferentially he advocated a law that, in order to protect private graves, would bestow the bodies of all criminals, not merely those of duelists and murderers, for anatomical study Further more, he presented a series of arguments of those who defend private resurrection for anatomical study, and examined each This résumé, probably derived from a physician, is of interest as giving the attitude of the medical profession at that time<sup>25</sup>

In the Supreme Judicial Court, sitting in Salem in November, 1818, the jury returned three separate indictments, each involving a different body, against Dr Thomas Sewall, the local physician in Chebacco On the plea of counsel that one indictment was inaccurately drawn, it was nolle prossed<sup>26</sup> The two other indictments were continued to the April term of 1819, and again to the November term Dr Sewall was tried in Novem

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## THE CEREBROSPINAL FLUID IN OPTIC NEURITIS, "TOXIC AMBLYOPIA" AND TUMORS PRODUCING CENTRAL SCOTOMAS\*

ARTHUR L. WATKINS, M.D.†

BOSTON

THE differential diagnosis of visual disturbances, particularly those with a central scotoma of the visual field caused by tumors or abscesses, and toxic or degenerative conditions, has been a subject of numerous publications<sup>1-6</sup> There still remains difficulty, however, in separating cases requiring surgical treatment, as recent experiences in this clinic have demonstrated. Some patients have been operated on with negative findings, while others have been operated on too late to benefit sight. In an attempt to add to our better understanding of this problem, 120 patients have been studied who came to the hospital primarily for loss of vision and were found to have central scotomas. All the patients received one or more

lumbar punctures,† and to present the results of these examinations is the purpose of this study. In spite of the voluminous literature on cerebrospinal fluid and the recent publication of a book devoted to the subject, little information is available beyond individual case reports as to the cerebrospinal fluid findings in affections of the optic nerves.

The classification of the various groups of disorders affecting the optic nerves, chiasm and tracts has been and still is confusing. It is necessary, therefore, to make arbitrary definitions for the sake of clarity. In the first place, all patients with syphilis have been excluded, and in this series blood Wassermann and Hinton tests and spinal-fluid Wassermann tests were all negative. There remain the following groups: retrobulbar optic neuritis, "toxic amblyopia", other types of optic neuritis, and tumors.

\*From the Massachusetts General Hospital and the Massachusetts Eye and Ear Infirmary.

†Assistant in neurology Harvard Medical School resident in neurology Massachusetts General Hospital.

†All fluids were examined with the same technique in the Spinal Fluid Laboratory of the Massachusetts General Hospital.

by providing proper subjects for the Anatomist and Physician. They may be found among those who have forfeited their lives and liberties to the people.

In continuation the medical profession is called upon to secure enactment of such a law<sup>21</sup>

There was no law in any New England state at this time regarding the bodies of convicts other than murderers. The first came in Connecticut in 1824. This advocacy, from a lay source, of legalization of practical anatomy was unusual, and may have been inspired by a young physician who had located in Salem a few weeks before and who later became the leading surgeon of that city. This was Abel Lawrence Peirson, a graduate in 1816 from the Harvard Medical School, to which he sent many students in later years.

The editorial just quoted had no immediate effect on the Massachusetts Medical Society. Examination of its records shows no mention of dissection for ten years. In 1828 this society revised its recommended program of study for one seeking membership, and added this significant sentence: "It is recommended as indispensable for a practitioner of Medicine and Surgery to prosecute dissection." This advised what, under the law of 1815, was a felony. The situation needed to be remedied.

Dr. Peirson became a fellow of the Massachusetts Medical Society in 1821. In 1826, while still a very young man, he was elected a councilor. In February, 1829, he proposed that a committee be appointed to petition the legislature "to modify the existing laws which operate to forbid the procuring of subjects for anatomical dissection." In June the society made Dr. Peirson chairman of a committee of nine chosen for this purpose. The committee included the most eminent members of the society, all of them much older than Dr. Peirson.<sup>30</sup>

This committee prepared an address to the public which advocated that bodies which must be buried at public expense be made available for practical anatomy. A considerable part of the address was devoted to an argument against the traditional idea that dissection was a stigma and a penal offense. Some passages clearly refer to the events at Chebacco and the conviction of Dr. Sewall, although no names are mentioned. Much of the phraseology of the Salem editorial of 1818 is included verbatim.<sup>4</sup> Here and elsewhere are hints that Dr. Peirson was more intimately connected with the events at Chebacco than appears from the records so far discovered.

In his address to the legislature in 1830 the Governor commended the request of the medical profession for change in the law regarding dissection.<sup>31</sup> A bill was introduced at the end of the

session and carried over to the session of 1831, when it came up early in February. On invitation, Dr. John C. Warren delivered a lecture on anatomy at a joint session of the legislature. The bill was enacted and signed February 28, 1831. Its title was "An Act more effectually to protect the Sepulchres of the Dead and to legalize the study of Anatomy in certain Cases,"<sup>32</sup> a name which subordinated the main purpose of the law. In his address in 1830 the Governor had cautioned that because of the state of the public mind, any law on this subject should be drawn without too direct reference to its purpose. The law was slightly amended in 1834 and the new bill was signed April 1. On July 5 the legislature of New Hampshire passed an identical law.<sup>33</sup>

The most important feature of this act was that it repealed that part of the statute of 1815 which made it a felony to be in possession of any human body to be used for dissection, except that of a duelist or an executed murderer. A second important feature was that it began to remove from the public mind the old idea that dissection was necessarily linked with major crimes and therefore a stigma, but this notion persisted, and thirty years later Thomas Wentworth Higginson referred to "the last ignominy of the dissecting room."<sup>34</sup>

This law did not provide adequate dissecting material for the medical schools, although in its text it gave them preference. This was because the turning over to medical schools, licensed physicians or medical students of bodies that must otherwise be buried at public expense was permissible, but not compulsory upon public officials, and local and personal sentiment deterred such officials from the permissive course. Private resurrection, mainly from potters' fields, continued.

This law was the beginning of the present-day anatomical laws in New England. Dr. Peirson of Salem was the leader in securing its enactment, and there is definite relation in time and place between the events in Chebacco in 1818, leading to the conviction of Dr. Sewall, and the activity of Dr. Peirson, who located in Salem in the midst of the excitement caused by these events and remained there until his death in 1853. The causal relation cannot, with evidence so far discovered, be proved intimate, but the sequence, location and proponent of the law suggest at least an influence. Thus the episode of 1818 is seemingly related to the present-day teaching of anatomy in New England.

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lumbar punctures,† and to present the results of these examinations is the purpose of this study. In spite of the voluminous literature on cerebrospinal fluid and the recent publication of a book devoted to the subject, little information is available beyond individual case reports as to the cerebrospinal fluid findings in affections of the optic nerves.

The classification of the various groups of disorders affecting the optic nerves, chiasm and tracts has been and still is confusing. It is necessary, therefore, to make arbitrary definitions for the sake of clarity. In the first place, all patients with syphilis have been excluded, and in this series blood Wassermann and Hinton tests and spinal fluid Wassermann tests were all negative. There remain the following groups: retrobulbar optic neuritis, "toxic amblyopia", other types of optic neuritis, and tumors.

\*All fluids were examined with the same technic in the Spinal Fluid Laboratory of the Massachusetts General Hospital.

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†Assistant in neurology, Harvard Medical School; resident in neurology, Massachusetts General Hospital.

## RETROBULBAR OPTIC NEURITIS

The retrobulbar cases are further divided into acute and chronic, depending on the speed of onset. This group was characterized by a rapid loss of vision within a few hours or days in acute cases, and gradual loss of vision in a month or more in the chronic cases. There was usually tenderness of the eyeballs, either choked, pallid or normal optic disks, and visual fields with central scotomas. There were 40 cases of acute retrobulbar neuritis, with an average age of thirty-three, 85 per cent being under forty. Loss of vision progressed rapidly over a period of a few hours or days. Sixty per cent of the patients complained of painful eyes or pain on motion of the eyeballs. The optic disks showed hyperemia or slight choking in 48 per cent, and in the other cases were negative or slightly

multiple sclerosis before, coincident with or after their visual disturbances. If, however, only the 18 cases are considered which were followed for more than three years, the incidence rises to 50 per cent. The follow-up, however, was not sufficient to rule out multiple sclerosis in the cases of unknown etiology. Seven out of the 9 cases with multiple sclerosis were unilateral, and 5 of these had strong first-zone gold-sol curves. Of the 9 cases associated with multiple sclerosis, in 3 the retrobulbar optic neuritis occurred two, six and fourteen years after the first symptoms, in 3 the retrobulbar neuritis preceded the multiple sclerosis by four, three and one years, and in 3 the retrobulbar neuritis and other symptoms were noted coincidentally.

We conclude, therefore, from our examination

Table 1 Summary of Data in 120 Patients with a Chief Complaint of Loss of Vision

DATA	DIAGNOSES			
	ACUTE RETROBULBAR OPTIC NEURITIS (40 CASES)	CHRONIC RETROBULBAR OPTIC NEURITIS (39 CASES)	TOXIC AMBLYOPIA (30 CASES)	TUMORS (11 CASES)
Age	Avg 33 85% under 40	Avg 39 62% over 40	Avg 52 54% over 50	Range 24 to 59
Clinical findings				
Tender eyeballs	60%	22%	None	None
Optic disks	48% choked 12% pale 40% negative	21% choked 72% pale 7% negative	100% negative or slightly pale	1 choked 7 pale 3 negative
Visual field defects	Central scotoma	Central scotoma	Central or cecocentral scotoma	8 central scotoma 3 probable scotoma
Spinal fluid findings				
Initial pressure	60 to 300 mm	80 to 200 mm	80 to 210 mm	110 to 420 mm
Cells	95% normal (0 to 34 lymphocytes)	100% normal	70% normal (0 to 13 lymphocytes)	10 normal (0 to 50 lymphocytes)
Total protein	Avg 34 mg (19 to 49 mg)	Avg 35 mg (15 to 49 mg)	Avg 33 mg (20 to 70 mg)	Avg 101 mg (56 to 144 mg)
Gold sol curve	28% positive	100% negative	100% negative	1 positive
Course	88% better 18% recurrence	100% unimproved	40% better	All gradually or rapidly grew worse until time of operation

pale. Central scotomas were of varying character and degree. The visual acuity varied from 20/30 to complete loss of light perception. In 75 per cent of the patients only one eye was involved. Although 88 per cent recovered from the acute attack, 18 per cent had recurrences in the same or the opposite eye.

The cerebrospinal fluid initial pressure was normal, or in a few cases increased. The cellular content was normal in 95 per cent, there being only 2 cases with 19 and 34 lymphocytes per cubic millimeter respectively. The total protein was also normal, averaging 34 mg per cent and varying from 19 to 49 mg per cent. Twenty-eight per cent of the 40 cases had an abnormal gold-sol curve, that is with 3's or 4's or 5's in the first zone or rarely in the mid-zone.

Twenty-seven per cent of these patients had

of 40 cases of acute retrobulbar neuritis that the cerebrospinal fluid is normal except in cases caused by multiple sclerosis. In these, which form 25 to 50 per cent of the group, the gold-sol curve may show a strong first-zone reaction.

Thirty-nine cases were classified as chronic retrobulbar optic neuritis. The onset of the visual disturbance in these patients was slow, and gradually progressive over a period of months rather than weeks. The average age was somewhat higher than in the acute cases, being thirty-nine, with 62 per cent over forty. Both eyes were affected slightly more frequently (54 per cent) than one alone, and the eyeballs were tender and painful in only 22 per cent. Pallor of the optic disks was usually observed (72 per cent), but they were hyperemic in 21 per cent and normal in 7 per cent. The characteristic field was a central scotoma, and the visual impairment showed progression to



nearly complete blindness. Lumbar punctures revealed no abnormality in initial pressure, cellular content, total protein or gold-sol curve. The total protein averaged 35 mg per cent, and upper and lower limits were 49 and 15 mg per cent.

The etiology was unknown in 85 per cent of the cases and proved to be multiple sclerosis in 15 per cent. Because of uncertainty in diagnosis there were 2 exploratory operations among this number, both revealing no gross lesions of the optic nerves, chiasm or sheaths. Although no pathologic material is available the presence of tumors in this group is unlikely in view of the long time (three to twenty years) most of these cases were followed without roentgenologic changes or the development of other symptoms or signs. The course in this group is significant, for in no case was there any improvement in vision in spite of various treatments, including general hygienic measures, spinal-fluid drainage, search for and, if present, eradication of foci of infection, and fever therapy with typhoid vaccine. It is probable that a certain number of these cases might be classified as Leber's disease, but because of no definite hereditary background they were not so diagnosed. The cerebrospinal fluid has been reported as normal in this condition, and one expects a normal fluid in chronic retrobulbar neuritis also, as concluded from our series.

#### "TOXIC AMBLYOPIA"

"Toxic amblyopia" was diagnosed in 30 cases, the average age being fifty-two, a distinctly older age incidence. The course was one of slow progressive loss of vision in both eyes, although not necessarily equally. There was one exception, a case of acute lead intoxication in which the onset was abrupt within twenty-four hours. The eyeballs were in no case tender, and the optic disks were either normal or slightly pale. The diagnosis was made from visual-field examination, the characteristic field being a cecocentral scotoma, particularly for red and green, although in some cases it was made from a history of over indulgence in alcohol and tobacco and the presence of a central scotoma similar to retrobulbar neuritis. Most of the cases were diagnosed in the Massachusetts Eye and Ear Infirmary on these characteristic clinical findings, before there developed more recent knowledge concerning the role of avitaminosis. The term "toxic" is therefore somewhat misleading, although there is still no general agreement as to the role of possible toxic agents, particularly tobacco and alcohol. Forty per cent of these patients improved after reducing or stopping the use of tobacco or alcohol.

Cerebrospinal fluid examinations showed in-

ital pressures which were usually normal (80 to 210 mm of water). In general there was no pleocytosis, although 1 case showed 13 lymphocytes. The total protein averaged 33 mg per cent, being distinctly abnormal in only 2 cases, the highest being 70 mg per cent. No explanation is apparent for the abnormality in these 2 cases, as they clinically resembled the others. The gold-sol curve was negative in all cases. In summary, then, a normal cerebrospinal fluid was found in over 90 per cent of patients with "toxic amblyopia."

#### OTHER TYPES OF OPTIC NEURITIS

This group includes those cases which showed a diminution of vision, papillitis and a constricted field of vision. The classification is purely arbitrary, for it is well realized that the term "optic neuritis" is so widely used, to include almost any affection of the optic nerve, that it must be defined in each separate usage. It is possible that in these cases inasmuch as there was loss of vision there actually were relative central scotomas, although not demonstrated, and the relation between these cases and retrobulbar neuritis is certainly close. They are separated only because the fields of vision differed from the others and loss of visual acuity was less marked than in the typical case of retrobulbar neuritis. The 5 cases included in this study were between the ages of four and forty-six. There was tenderness of the eyeball in only 1 case. As already mentioned, there was slight choking of the optic disks and peripheral constriction of the visual fields, and half had unilateral involvement only. Lumbar punctures showed normal initial pressures, 0 to 10 lymphocytes, normal total protein and negative gold-sol curves. All cases were of fairly rapid onset during the course of a few days, and normal vision was regained. In 2 cases there occurred a pansinusitis coincidentally, and in another, hay fever. One patient had a definite lead intoxication which seemed of etiologic significance.

Six other cases are of interest because of optic neuritis, although it was not the chief complaint. Three patients had transverse spinal cord lesions and retrobulbar neuritis, which was thought to be on an unclassified infectious basis but fitted into the clinical syndrome of neuromyelitis optica. The other 3 were cases of blindness with central scotomas and multiple peripheral neuritis. An autopsy of one of the latter cases revealed extensive periarteritis. In the 3 cases of neuromyelitis optica and the 2 of multiple peripheral neuritis with optic neuritis there was definite abnormality of the cerebrospinal fluid, with 10 to 30 lymphocytes and a total protein as high as 585 mg per cent. In the case of periarteritis the fluid was normal.

## TUMORS

There were 11 patients studied who came to the hospital primarily for loss of vision without other appreciable symptoms, and who were found to have tumors pressing on the optic nerves, chiasm or tracts, at operation or autopsy. These cases are of particular interest because at first the diagnosis of retrobulbar neuritis or "toxic amblyopia" was made. In 8 of these definite central scotomas were found, and in 3 the loss of vision was so extensive that accurate determinations of visual fields were impossible. The optic disks were atrophied in 7 cases, choking in 1, and normal in 3. In no case were the eyeballs tender or painful on motion. The visual loss was bilateral in 9 patients. Stereoscopic x-ray examination of the skull without air injection suggested tumor in the region of the sella turcica in 5 cases and was negative in 6.

Examination of the cerebrospinal fluid by lumbar puncture revealed initial pressures which were normal in 7 cases and slightly elevated, about 200 mm of water, in 4. The cellular content was normal in all but 1, which showed 50 lymphocytes. The total protein averaged 101 mg per cent, being abnormally high (greater than 50 mg per cent) in all cases. Two gold-sol curves had mild mid-zone reactions, the others were negative. This fluid abnormality of elevated protein content was of clinical value for correct diagnosis and operation, except in 1 case of aneurysm in which the diagnosis was not made until post-mortem examination. The pathological reports in these 11 cases were: 3 pituitary tumors, 7 meningiomas and 1 aneurysm of the circle of Willis, all these caused pressure on the optic nerves.

For comparison 11 cases are included which had similar histories with complaints of visual loss only. On first examination the diagnosis of retrobulbar neuritis was entertained, but on visual-field determination a bi-temporal or homonymous hemianopsia was discovered which was sufficient to localize the lesion in the optic chiasm and to suggest tumor. In 8 cases with bi-temporal field defects the optic disks were normal in 5 and atrophied in 3, while in 1 there was atrophy of one eye and choking of the other. Three cases with homonymous hemianopsia had primary optic atrophy. X-rays of the skull were negative in 4 cases and showed evidence for tumor in the pituitary region in 7.

The initial spinal fluid pressure was normal in 10 cases and elevated in 1. Cell counts were normal in all except 1, which had 21 lymphocytes. The gold-sol curves were also negative. The total protein averaged 60 mg per cent but was normal in 4 cases. The pathological findings upon oper-

ation or at autopsy included meningioma, pituitary tumor, craniopharyngioma and aneurysm, all pressing on the optic chiasm.

The conclusion is made from the 22 tumor cases that the cerebrospinal-fluid pressure, cellular content and gold-sol curve may all frequently be within normal limits, but the total protein is usually increased two to five times normal when there is present a central scotoma from pressure of tumors or aneurysms on the optic nerves or chiasm.

## COMMENT

The literature on retrobulbar neuritis was summarized by Dunphy<sup>8</sup> in 1930, and very little of importance has been added since then. The relation between multiple sclerosis and retrobulbar neuritis has been well recognized. There are available no long series of cases of statistical value, but authors agree fairly closely. When the cases of Adie<sup>3</sup> and Popek<sup>9</sup> and those reviewed by Dunphy<sup>8</sup> are combined, we find 402 cases of retrobulbar neuritis, 160 (40 per cent) having multiple sclerosis.

Several papers have been written on the relation of sinus infection to retrobulbar optic neuritis,<sup>10</sup> but in recent years this etiology has been belittled, in the present series, sinus infection was sought in each case but was found in only 1. There remain about half the cases in which no satisfactory etiologic agent could be determined. Clinically the important point in diagnosis is the mode of onset and course of the disease. The acute cases nearly all improve spontaneously, and do so before the diagnosis of tumor need be seriously entertained. They occur in a young age group, and are largely unilateral and associated with tender, painful eyeballs. The cases of chronic retrobulbar neuritis offer a difficulty in differentiation from tumor, since their courses are not dissimilar and the prognosis for spontaneous recovery is poor. It is in this group particularly that spinal-fluid examination may be of great value in leading one to the correct diagnosis.

The etiology of "toxic amblyopia" is beyond the scope of this paper. Clinically the diagnosis is not usually difficult. It occurs in a distinctly older age group, characteristic field defects are present, and in general the cerebrospinal fluid is normal, although there may be some abnormality. Carroll<sup>1</sup> in 1935 reported 10 cases with cerebrospinal-fluid examinations. 9 had normal cell counts, in 6 the total protein was greater than 40 mg per cent and in 2 greater than 60 mg. In 90 per cent of the cases in the present series, however, the fluid was normal, and clinically an increased total protein was found of distinct value in changing

the diagnosis from "toxic amblyopia" to tumor and in subsequent operative improvement

The small group of cases classified as optic neuritis offered little difficulty in differentiation from tumor, as the course was benign with fairly rapid recovery, and other etiologic factors were usually apparent. Normal pressures help to differentiate the disease and papilledema.

The cases with tumor are of particular interest because of the importance of making the diagnosis so that sight might be saved. Bi-temporal or homonymous field defects were of the utmost diagnostic value, and led one to suspect tumor, very often x-ray changes bore out this assumption. There are a certain number of cases in which the fields may be similar to those of retrobulbar neuritis of other origin, as noted by Kennedy,<sup>1</sup> and it is in these cases in particular that the spinal-fluid protein may be of differential significance. No conclusions can be drawn as to why some tumors produce central scotoma and others temporal or homonymous field defects, as the anatomical descriptions are not minute enough. It can be seen, however, that pituitary tumors, meningiomas and aneurysms can all produce a central scotoma, and the presence of this defect does not therefore help in pathological differentiation.

Chiasmal arachnoiditis has been mentioned in the literature by several authors as a cause of blindness, and is said to produce various defects in the visual fields. In particular, Craig and Lillie<sup>5</sup> cited 8 cases, 3 of them with necropsy reports which showed generalized inflammatory reactions of the meninges. Clinically they were associated with infection such as encephalitis or trauma. As indicated, 3 patients died after operation, and the others were not helped by the procedure. Usually the diagnosis of arachnoiditis has been made on a basis of a negative operation or the finding of thick-

ened chiasmal arachnoid, and in these cases the results have been more favorable.<sup>6</sup> In no case in this series has a diagnosis of chiasmatic arachnoiditis been confirmed.

#### SUMMARY AND CONCLUSIONS

The cerebrospinal-fluid findings in 120 cases of acute and chronic retrobulbar neuritis, "toxic amblyopia" and tumors producing central scotomas are reported.

In acute retrobulbar neuritis without demonstrable cause the spinal fluid was normal except in older cases associated with known multiple sclerosis (25 to 50 per cent). In these there were a few lymphocytes, a high normal total protein and a strong first-zone gold-sol reaction.

The spinal fluid was normal in so-called chronic retrobulbar neuritis and probable "toxic amblyopia" in 95 per cent of the cases.

In 11 patients with tumor or aneurysms producing central scotomas the spinal-fluid protein was increased two to five times the normal amount. This fluid abnormality was a valuable diagnostic point in differentiating tumor and the other causes of central scotomas.

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## REGIONAL ENTERITIS

## A Study of Five Cases

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SPRINGFIELD

IN 1932 Crohn and his associates<sup>5</sup> described regional enteritis and its treatment. Since that time over thirty articles have appeared in the American literature dealing with this condition. It was originally described as terminal ileitis, later as regional ileitis<sup>4</sup> and regional enteritis,<sup>1</sup> and more recently as segmental enteritis,<sup>12</sup> the terminology having been changed with increasing knowledge of the disease.

In the first described cases only the terminal ileum was involved. Later the disease was observed more proximally in the small intestine extending up to the jejunum,<sup>8</sup> and it has been found in the stomach<sup>10</sup> and large bowel.<sup>6, 12</sup> It was originally thought to be a condition confined to young adults, but the incidence is now known to be much broader, with an average age of thirty-two. More men than women are affected.

The etiology of the disease is generally admitted to be unknown.<sup>9</sup> Half Crohn's patients had had appendectomy. In discussing Crohn's<sup>9</sup> paper Felsen quoted several cases of his own which he believed to be due to bacillary dysentery. But Crohn in reply stated that in his series of 60 cases only 1 had a positive agglutination test for dysentery, and that when many cases of dysentery were in the hospital there were no patients with regional ileitis. Paulson,<sup>15</sup> on the other hand, agrees with Felsen as to the bacillary origin of the condition.

In the American literature the majority of cases of regional ileitis seem to be in the Jewish race, and it is noteworthy that persons of Irish descent or those with old American names are scarcely ever affected with the disease. Inasmuch as 70 per cent of the population of New England have so-called Irish or Yankee names, it would be expected that some such proportion of cases with this condition would bear such names were there no racial predilection. This is, however, not so in the 5 cases reported in this paper. In this regard, Dr Crohn writes:

Your question as to a racial tendency in regional enteritis is one which has repeatedly been asked of me. I doubt very much that enteritis is in any way a racial or geographic problem. The world literature on ileitis now covers almost all countries. England seems to be having a great number of cases, particularly Scotland. Holland also seems to have a large number

of cases due to the fact that Snapper and his clinic are very alert on the subject.

Jews are clannish people and have a tendency to congregate. Both my practice and the patients in the hospital are predominately Jewish, and therefore most of our cases are of Jewish extraction. Lewisohn,<sup>17</sup> of New York City, does not believe we are dealing with a racial disease. Two of Probst's<sup>18</sup> 3 patients were Jewish.

Homans<sup>9</sup> reported 2 cases which occurred in Jewish patients, and he<sup>10</sup> writes that he thinks that in Boston he has seen no one suffering from this disease who was not a Jew. Clute<sup>2</sup> did not stress the racial strain of his 2 cases. He<sup>3</sup> writes that he has recently operated on another case in an Italian woman. Mixer and Starr<sup>13</sup> reported that 17 of the 20 patients observed at the Beth Israel Hospital, Boston, were Jewish. Dr Mixer<sup>14</sup> writes: "In a survey of the literature of the subject it seems to be generally accepted that there is a marked preponderance of regional enteritis occurring among Jews. We have had no outstanding number of Irish." Of the 5 cases reported in this paper, 3 patients were of Polish, Italian or French extraction.

Bearing in mind that although thromboangitis obliterans has now been shown not to be a race-linked disease, there is certainly something to arrest one's attention in the apparent racial distribution of the disease under consideration.

The symptomatology of the disease is most varied, and may be atypical in any particular case. In general the cardinal symptoms and signs are pain in the right lower quadrant, often colicky, fever, loss of weight, leukocytosis, marked anemia and a palpable mass in the abdomen. Any of these may be lacking. Crohn<sup>5</sup> speaks of four distinct clinical groups: first, those associated with peritoneal inflammation in a localized portion of the abdominal cavity, secondly, those simulating ulcerative colitis or enteritis, thirdly, those with obstructive symptoms, and fourthly, those attended by the formation of fistulas. Pessagno<sup>16</sup> has presented a case in which all these phases existed.

Not uncommonly the disease simulates acute appendicitis.<sup>11</sup> Undoubtedly it has been overlooked in many cases in which a normal appendix has been removed through a small appendectomy wound, and in the absence of a pathological examination it is quite probable that many "tumors" actually due to regional enteritis have been removed.

and an operative diagnosis of cancer made. In recent years the barium enema and barium meal, which in regional ileitis demonstrate a thin, string-like shadow, have been of great service in the clinical diagnosis of the condition.

The nature of the pathologic lesion is in doubt. It is more than probable that the condition has at its basis several histologic pictures. Crohn and his associates<sup>5</sup> believed that it was characterized by a subacute or chronic necrotizing and cicatrizing inflammation, the ulceration being subordinate to the connective tissue reaction and in the walls of the intestine leading to stenosis or more rarely



Figure 1

*There is a small depression in the region of the ileocecal valve. The terminal loops of ileum have filled irregularly and the most terminal portion has not retained the barium.*

to multiple fistulas. In gross, these observers described the disease as resembling tuberculosis, and they were of the opinion that the giant cells seen on microscopic sections were not diagnostic, but rather were due to vegetable matter caught in the ulcerated areas.

Homans<sup>9</sup> described lesions simulating Boeck's sarcoid rather than tuberculosis, he believed that the giant cells were produced in reaction to a foreign body, perhaps a lipid. Clute<sup>7</sup> pointed out that regional enteritis involved the mesentery as well as the wall of the bowel, and was of the opinion that the condition might start in the local lymph nodes. Lewisohn<sup>12</sup> in 1938 predicted that regional enteritis might turn out to be only a manifestation of ulcerative colitis, and stressed the importance of recognizing that segments of the intestine which are separated by healthy tissue are

frequently involved. Crohn<sup>6</sup> had previously declared that "skip areas" of this disease must be constantly watched for. Phillips<sup>17</sup> in 1934 reported in some detail the microscopic appearance of the lesion.

In Crohn's<sup>5</sup> first article he recommended excision of the diseased areas. Since then, however, some observers have reported favorable results and apparent cures from sidetracking operations, but since the disease was recognized as an entity only six years ago it is too early to appraise ultimate results. Other surgeons believe that short-circuiting should be done merely as a preparation for subsequent reaction. Even so, operative interference is not unattended by risk, for sinus formation may occur, and every hollow organ of the lower abdomen except the urinary bladder has been reported as having had a sinus connection with the original lesion. These fistulas may be cured by appropriate resection. Homans and Hass,<sup>9</sup> while recommending anastomosis and subsequent resection, declare that operation is by no means a certain cure and that there may be spontaneous recovery.

#### CASE REPORTS

*Case 1* (S. H. 128,926) H. J. P., a 53-year-old salesman, was admitted to the Springfield Hospital May 11, 1937, with irregular dietary habits and a colicky pain in his abdomen. He did not take alcohol. During the previous year he had noticed intermittent spasms of pain in the abdomen, at times localized in the right side, and accompanied by difficulty in bowel movements, but no bleeding. He had lost 30 pounds in weight during the year. The past history was non-contributory.

Physical examination showed a worried and somewhat emaciated man whose general appearance indicated an acute surgical condition in the abdomen. A barium enema given on the 1st hospital day showed an apparently complete obstruction about 5 cm. above the ileocecal valve. Under the fluoroscope the same defect was demonstrated, and the x-ray report was as follows: "The enema passed rapidly to the region of the cecum, with all parts movable. This has the appearance of a new growth."

Laboratory studies revealed a normal urine, a hemoglobin of 95 per cent and a red-cell count of 4,900,000. The white-cell count was 10,700, with 76 per cent polymorphonuclears, 11 per cent lymphocytes, 2 per cent eosinophils and 1 per cent myelocytes. Slight achromia was present, and the platelets were normal. The blood pressure was 154/76, the heart was slightly irregular, both in rate and rhythm. The lungs were clear and resonant, the extremities were normal, and the abdomen was normal except for some tenderness in the right lower quadrant.

With a preoperative diagnosis of malignancy of the bowel, operation was performed on May 13 with nitrous oxide oxygen and ether anesthesia, under which the patient did poorly. A right rectus incision was used. A thickened constricted tumor involving the cecum and adjacent small and large bowel was found. Palpation of the liver and mesentery showed no enlarged lymph nodes. About 30 cm. proximal to the cecum, the ileum was brought up through a midline incision, an ileostomy tube sewed in, and the peritoneum sewed only underneath the

intestine. The original wound was closed in layers. The next day the patient developed bronchopneumonia.

On May 27, under avertin, nitrous oxide, oxygen and ether anesthesia, a Mikulicz colostomy with resection of the tumor was accomplished. The pathological report was as follows:

The capillaries of the mucosa are distended with red blood cells, and in the stroma are found a few polymorphonuclear leukocytes, eosinophils and plasma cells. The blood vessels in the submucosa are dilated and filled with red blood cells and the tissue in this area shows some edema. There are numerous lymphocytes, polymorphonuclear leukocytes and eosinophils in this edematous tissue. In the muscularis and involving the submucosa are numerous necrotic areas showing giant-cell formation, with infiltration of a large number of polymorphonuclear leukocytes and plasma cells. This necrosis is not caseous in type. In some of these areas fibroblastic regeneration is marked, causing disappearance of muscle fibers. Connective tissue scarring is a prominent feature. Diagnosis: regional ileitis.

There was another stormy convalescence. The wound edges were very much inflamed and had a digested appearance. The bowel movements were loose, and the skin edges were treated with zinc oxide. Following a low residue diet the movements improved and the wound edges became less inflamed. Shortly the patient was up in a wheel chair and took care of the draining colostomy himself.

On August 6 the colostomy was closed and the patient developed a postoperative atelectasis from which he recovered in 3 days, during which time an oxygen tent was used. The wound improved and gradually healed and the patient was up and about. On August 24 he was discharged to his home with the colostomy wound closed and healed, but with the ileostomy wound still open. On September 22 he returned to the hospital and the ileostomy wound was closed. One Penrose drain was left in, reaching to the fascia. The patient was discharged October 6. Since then he has gained 20 pounds, feels perfectly well and has a clinically sound intestinal tract.

*Comment.* This case was at first wrongly diagnosed. The barium enema was of no help toward a correct pathological diagnosis, and a barium meal would have given him complete obstruction. He had neither a high white-cell nor a low red-cell count. He had no blood in his stools. A Mikulicz operation at first would probably have been fatal. This case demonstrates the necessity of being ready to do a lot or a little, depending on what is found and the patient's condition on the table. The ileostomy saved a life and in no way interfered with later treatment. Until the pathologist made his report, the tumor was thought to be malignant. Without this report and our present-day knowledge, it might have been regarded as a cancer.

*Case 2* (S. H. 131,085). F. F., a 54-year-old woman, was admitted to the hospital September 30, 1937. Her chief complaint was constipation with intermittent pain in her abdomen. For the past several years she had had to take laxatives daily. She had had intermittent black stools and occasional vomiting. The abdominal distress had recently become more persistent. Her appetite was poor and she had lost weight.

The physical examination was negative except for the gastrointestinal tract. The abdomen was generally tender with a feeling of fullness and a possible mass on the right side. On the day of entrance the red-cell count was 4,800,000, the hemoglobin 95 per cent and the white-cell

count 17,000. The following day, with a diagnosis of intestinal obstruction, the abdomen was opened under drop ether anesthesia. A tumor was found that involved the cecum and ascending colon and almost completely obstructed its foramen. A right colectomy was done by the Mikulicz method, staggering the ileum along the colon. A rubber tube was tied into the open end of the ileum, a Page clamp was left on the colon and the abdomen was closed in layers around the protruding ileum and colon. An extensive involvement of the mesenteric lymph nodes was observed, but no nodules could be felt in the liver. The pathological report was as follows:

The section consists of the cecum, appendix, 6 cm. of terminal ileum and 10 cm. of ascending colon. In the cecum is an ulcerated area, 4 cm. in diameter, with slightly raised, firm edges. The crater of this ulceration is dark red and smooth. There is considerable narrowing of the ileocecal valve. Diagnosis: regional ileitis.

On October 13 the red-cell count was 4,170,000, with a hemoglobin of 80 per cent. On October 27 the patient was discharged to her home, but returned on November 3 for the closure of her colostomy stoma. On November 4 the red-cell count was 3,980,000, the white-cell count 12,400 and the hemoglobin 80 per cent. On November 21 a blood examination showed 6400 leukocytes and a red-cell count of 3,650,000. On December 10 the patient was transfused with 420 cc. of whole blood, and 7 days later was discharged from the hospital. Since that time she has been clinically well.

*Comment.* This case illustrates how easily regional ileitis may be mistaken for malignancy with partial obstruction. In this case the white-cell count was raised but the red-cell count was normal, a condition not accounted for by dehydration. On completion of the operation, it was believed that an obstructing malignancy had been removed.

*Case 3* (S. H. 123,951). A. T., a 40-year-old Frenchman, was first seen in April, 1936, with precordial pain. His blood pressure was 180/120. He gave a history of epigastric pain about half an hour after meals. He said that as a young man he had had a rash, and later had received three or four doses of arsphenamine. He denied ever having had a positive Wassermann. He was admitted to the Springfield Hospital on June 10, giving a history of a gradual onset of general abdominal cramps and diarrhea with remissions of a week or less, similar symptoms having been noted 8 or 10 months previously. He said he had lost 22 pounds in the last 3 months. The blood pressure was 175/120, the heart and lungs were essentially normal, the abdomen was normal except for a mass resembling feces just to the right of the umbilicus. The red-cell count was 4,050,000, the hemoglobin 70 per cent and the white-cell count 37,000. The urine was negative. The findings gave the impression of cancer of the lower bowel.

Having developed a slight cold, the patient was sent home to recover from it. He returned on June 14. With a diagnosis of carcinoma he was operated on June 16 and a regional ileitis was found involving the terminal 25 cm. of the ileum, the cecum and all the ascending colon. A Mikulicz resection of the ileum, cecum, ascending colon and hepatic flexure was done. The pathological report was regional ileitis. The ileum and transverse colon were approximated and a Mixer glass tube was sutured into the open end of the ileum. A clamp was left on the colon. The wound was then closed in layers.

On July 2 the redundant colonic spur was amputated by diathermy. On July 23 the colostomy opening was

freed and the mucosa, muscle and fascia were coapted in layers. Two rubber tissue drains were inserted down to the fascia and the skin sutured with silkworm gut. The patient was discharged clinically well on August 12 but died 6 months later from coronary thrombosis.

*Comment* The previous story of abdominal cramps and some diarrhea seemed to justify a preoperative diagnosis of cancer of the lower bowel. In this, as in the two preceding cases, there was no blood in the stools, the red cell count and hemoglobin were a little low and the white-cell count quite high, as one would expect with an ulcerated carcinoma.

At operation, the extent of the condition brought to light the true diagnosis, which was later confirmed by the pathologist.

*Case 4* (S. H. 127,341) A. F., a 22 year-old Pole, was examined January 20, 1937, and the case was diagnosed as recurrent appendicitis. The day before he had begun to have pain in the right lower quadrant and vomited a small amount. He had no headache, no diarrhea, felt a tender mass in his right lower quadrant and gave a history of four or five previous similar attacks which lasted for 4 or 5 days. The history was otherwise negative.

Physical examination revealed a fairly well-developed, rather poorly nourished young man lying quietly in bed but co-operatively alert. The blood pressure was 120/80, with otherwise negative findings except tenderness in the right lower quadrant. The red-cell count was 4,450,000, the hemoglobin 85 per cent and the white-cell count 18,400. The urine was negative.

He was admitted to the hospital, and at operation a markedly inflamed terminal ileum with the distal portion of the appendix adherent to the ileum was found. A mass the size of a large English walnut was felt in the omentum, attached to the cecum about 8 cm. above the appendix. An appendectomy was done and the mass was freed from the cecum and removed. The area was repaired and the wound was closed without drainage. The pathological report was as follows:

The appendix measures 6 cm. in length. The tip is bulbous and 1 cm. in diameter. Microscopical examination shows acute, subacute and chronic inflammation. A piece of omentum contains a firm, but elastic, mass of tissue, measuring 2 cm. in diameter, whose cut surface is yellowish gray and granular, showing some necrosis in the center. The omentum shows marked fibroblastic proliferation, young capillaries and marked infiltration with lymphocytes, plasma cells and eosinophils. Many giant cells are present. There is no evidence of caseation or necrosis. Diagnosis: regional ileitis.

Shortly after discharge from the hospital the patient developed multiple fistulas in the wound. Six months later a resection of the distal end of the ileum, cecum and ascending colon was done at a Boston hospital. Since then he has felt perfectly well.

*Comment* This case was diagnosed as recurrent appendicitis, which in the light of the history and physical findings seemed justified. A white-cell count of 18,000 and a red-cell count of 4,450,000 were compatible with a diagnosis of acute appendicitis. The formation of multiple fistulas as illustrated in this case is apparently a common complication.

*Case 5* (S. H. 122,990) L. S., a 53-year-old Italian, was operated on for a retrocecal appendix on February 5, 1936. Operation revealed a hard, irregular mass involving the mesentery and mesoappendix. The latter was bound down to the mass. The red-cell count was 4,600,000, the hemoglobin 80 per cent and the white-cell count 9500. The

patient was discharged with a diagnosis of chronic appendicitis and terminal ileitis. The pathological report on the appendix was as follows:

In the stroma of the mucosa there are numerous eosinophils and an occasional plasma cell. In the submucosa there is some lymphocytic infiltration, and an occasional plasma cell and eosinophil are seen. In the muscularis there is an area showing giant-cell formation. Around these giant cells there are numerous polymorphonuclear cells, a few lymphocytes and a scattering of eosinophils. Fibroblastic reaction is active, and there are numerous newly formed capillaries. This fibroblastic reaction extends into and to some degree distorts the muscular coats. The blood vessels just under the serosa are dilated and filled with red blood cells. This area just under the serosa shows perivascular infiltration of lymphocytes. A collection of lymphocytes with occasional polymorphonuclear and plasma cells and eosinophils is found in the meso-appendix. Diagnosis: subacute appendicitis, ? regional enteritis.

This patient has not been located since he was discharged from the hospital.

#### SUMMARY AND CONCLUSIONS

A series of 5 cases of regional enteritis are reported. From a study of the literature and of these cases, it is clear that many of the classic symptoms of the disease may be absent in a given case. Furthermore, there is a tendency for those in the younger age group to develop small-bowel lesions, whereas those in the older age group have large-bowel disease. In view of the varying conditions found at operation, no standard operative technic can be recommended. In the majority of cases the ultimate diagnosis rests on the pathologist.

From the literature and my own experience it seems that the longer a family has been in the United States the less liable its members are to have this condition, and one gathers the impression that the Jewish race is most prone of all to suffer from it.

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The capillaries of the mucosa are distended with red blood cells, and in the stroma are found a few polymorphonuclear leukocytes, eosinophils and plasma cells The blood vessels in the submucosa are dilated and filled with red blood cells and the tissue in this area shows some edema There are numerous lymphocytes, polymorphonuclear leukocytes and eosinophils in this edematous tissue. In the muscularis and involving the submucosa are numerous necrotic areas showing giant-cell formation, with infiltration of a large number of polymorphonuclear leukocytes and plasma cells This necrosis is not caseous in type. In some of these areas fibroblastic regeneration is marked, causing disappearance of muscle fibers Connective tissue scarring is a prominent feature. Diagnosis regional ileitis

There was another stormy convalescence. The wound edges were very much inflamed and had a digested appearance. The bowel movements were loose, and the skin edges were treated with zinc oxide Following a low-residue diet the movements improved and the wound edges became less inflamed. Shortly the patient was up in a wheel chair and took care of the draining colostomy himself.

On August 6 the colostomy was closed and the patient developed a postoperative atelectasis from which he recovered in 3 days, during which time an oxygen tent was used. The wound improved and gradually healed and the patient was up and about. On August 24 he was discharged to his home with the colostomy wound closed and healed, but with the ileostomy wound still open. On September 22 he returned to the hospital and the ileostomy wound was closed One Penrose drain was left in, reaching to the fascia. The patient was discharged October 6 Since then he has gained 20 pounds, feels perfectly well and has a clinically sound intestinal tract.

*Comment* This case was at first wrongly diagnosed. The barium enema was of no help toward a correct pathological diagnosis, and a barium meal would have given him complete obstruction He had neither a high white-cell nor a low red-cell count. He had no blood in his stools A Mikulicz operation at first would probably have been fatal This case demonstrates the necessity of being ready to do a lot or a little, depending on what is found and the patient's condition on the table. The ileostomy saved a life and in no way interfered with later treatment. Until the pathologist made his report, the tumor was thought to be malignant. Without this report and our present-day knowledge, it might have been regarded as a cancer

*Case 2* (S. H. 131,085) F. F., a 54-year-old woman, was admitted to the hospital September 30, 1937 Her chief complaint was constipation with intermittent pain in her abdomen. For the past several years she had had to take laxatives daily She had had intermittent black stools and occasional vomiting The abdominal distress had recently become more persistent. Her appetite was poor and she had lost weight.

The physical examination was negative except for the gastrointestinal tract. The abdomen was generally tender with a feeling of fullness and a possible mass on the right side. On the day of entrance the red-cell count was 4,800,000, the hemoglobin 95 per cent and the white-cell

count 17,000 The following day, with a diagnosis of intestinal obstruction, the abdomen was opened under drop ether anesthesia. A tumor was found that involved the cecum and ascending colon and almost completely obstructed its foramen A right colectomy was done by the Mikulicz method, staggering the ileum along the colon. A rubber tube was tied into the open end of the ileum, a Page clamp was left on the colon and the abdomen was closed in layers around the protruding ileum and colon An extensive involvement of the mesenteric lymph nodes was observed, but no nodules could be felt in the liver The pathological report was as follows

The section consists of the cecum, appendix, 6 cm. of terminal ileum and 10 cm. of ascending colon In the cecum is an ulcerated area, 4 cm. in diameter, with slightly raised, firm edges The crater of this ulceration is dark red and smooth. There is considerable narrowing of the ileocecal valve. Diagnosis regional ileitis

On October 13 the red-cell count was 4,170,000, with a hemoglobin of 80 per cent. On October 27 the patient was discharged to her home, but returned on November 3 for the closure of her colostomy stoma. On November 4 the red-cell count was 3,980,000, the white-cell count 12,400 and the hemoglobin 80 per cent. On November 21 a blood examination showed 6400 leukocytes and a red cell count of 3,650,000 On December 10 the patient was transfused with 420 cc. of whole blood, and 7 days later was discharged from the hospital. Since that time she has been clinically well.

*Comment* This case illustrates how easily regional ileitis may be mistaken for malignancy with partial obstruction In this case the white-cell count was raised but the red-cell count was normal, a condition not accounted for by dehydration On completion of the operation, it was believed that an obstructing malignancy had been removed.

*Case 3* (S. H. 123,951) A. T., a 40-year-old Frenchman, was first seen in April, 1936, with precordial pain His blood pressure was 180/120 He gave a history of epigastric pain about half an hour after meals He said that as a young man he had had a rash, and later had received three or four doses of arsphenamine. He denied ever having had a positive Wassermann He was admitted to the Springfield Hospital on June 10, giving a history of a gradual onset of general abdominal cramps and diarrhea with remissions of a week or less, similar symptoms having been noted 8 or 10 months previously He said he had lost 22 pounds in the last 3 months The blood pressure was 175/120, the heart and lungs were essentially normal, the abdomen was normal except for a mass resembling feces just to the right of the umbilicus The red-cell count was 4,050,000, the hemoglobin 70 per cent and the white-cell count 37,000 The urine was negative. The findings gave the impression of cancer of the lower bowel

Having developed a slight cold, the patient was sent home to recover from it. He returned on June 14 With a diagnosis of carcinoma he was operated on June 16 and a regional ileitis was found involving the terminal 25 cm. of the ileum, the cecum and all the ascending colon A Mikulicz resection of the ileum, cecum, ascending colon and hepatic flexure was done. The pathological report was regional ileitis The ileum and transverse colon were approximated and a Mixer glass tube was sutured into the open end of the ileum A clamp was left on the colon The wound was then closed in layers

On July 2 the redundant colonic spur was amputated by diathermy On July 23 the colostomy opening was



may be constant or inconstant in its presence, and despite its variability in size is always characterized by a feeling of elongation rather than of roundness. Tenderness varies in degree but is always present. Distention is the third most constant sign, but is usually late in appearance and is directly dependent on the degree of obstruction. Peristalsis can usually be seen, and the abdomen tends to remain soft in distinction to its rigidity in obstructions due to other types of lesions. The blood picture is not particularly characteristic. A low-grade anemia occurs in the chronic cases. The white blood cells increase rapidly as the intussusception develops, the count rising to about 20,000. Microscopic blood in the feces cannot be demonstrated until late in the disease. Shock is usually a late sign, and in this series was noted in only 1 case. X-ray findings are of very questionable value in the diagnosis of polyposis, especially after the clinical picture has developed to the point of obstruction from an intussusception. Prior to this, however, most writers agree that these tumors can be demonstrated roentgenologically by careful technic and interpretation.

Symptomatically, polyposis in the small intestine is marked by a fairly consistent pattern. The pain is generalized in the upper abdomen without localization. It is cramp-like and of variable duration and intensity. Nausea and vomiting usually follow the onset of pain, increasing with the rapidity and completeness of the obstruction. In the cases with a history of long-standing vague abdominal symptoms, nausea and vomiting were not prominent until the intussusception had developed and had remained long enough to cause obstruction. It is also to be noted that obstipation was a constant characteristic in our group and that no cases showed diarrhea. The chronicity of the symptoms was impressive, in 1 case they had been present for two weeks, and in another ten years.

The treatment of benign polyps is early surgical removal. In considering the method by which this may be best accomplished we find the technical procedure influenced by the type of lesion and by the complications already developed before operation. The solitary polyp, which according to Raiford<sup>1</sup> is the apex of the intussusception, is telescoped by traction into a lower portion of the bowel. He believes the mechanism of this type of intussusception is different from that in children where hypermotility, as well as irregular motility, of the bowel is the causative factor.

The simplest type of operation is excision of the polyp, after opening the bowel either in the long or transverse axis, and immediate closure. A primary resection of the involved portion is indicated when there are multiple polyps or when the via-

bility of the bowel is questionable. In this event a proximal enterostomy may complete the operation. In some cases, a two stage operative procedure comprising a lateral anastomosis, to be followed by a second-stage removal of the growth-bearing loop, may be the method of choice. We believe that the latter is preferable to a primary resection and anastomosis. Lastly, rather than do a primary resection in those cases where the viability is questionable or when we desire to obviate the danger of absorption, we prefer to remove the mass from the abdomen and suture a tube into the proximal bowel.

In this series of 7 operations, resection was performed twice: an end-to-end anastomosis and a side-to-side anastomosis. The remaining 5 consisted of simple excision of the polyp and immediate closure of the bowel. All the patients were discharged from the hospital well. The general opinion is that the prognosis is good when appropriate surgical measures are instituted early.

#### CASE REPORTS

*Case 1.* C. G., a 4-year-old boy, was admitted to the hospital March 22, 1918, complaining of abdominal cramps after eating, accompanied by occasional vomiting. These symptoms had persisted for 2 days prior to admission. He had been a full term, spontaneously delivered, normal infant. There was no history of childhood or familial disease. Physical examination disclosed an apprehensive child, well nourished and of normal development. The temperature was 98.5°F and the pulse 150. Physical examination disclosed negative findings except in the abdomen, which was soft, not distended, and free of rigidity and spasm. There was a large, doughy, non-tender mass extending from the right to the left side of the midabdomen. The liver and spleen were not palpable. The white cells numbered 18,500, with 85 per cent polymorphonuclears. The urine was normal. Immediate operation was decided on. Through a right rectus exploration an intussuscepted mass involving the terminal 90 cm. of ileum was found. This mass was easily reduced. The bowel was of good color, and a small polyp was palpable at the head of the intussusception. The intestine was opened in its long axis, and a polypoid growth the size of a walnut was removed. The incision in the bowel was closed and the abdomen was closed without drainage. Recovery was uneventful, and the patient was discharged well in 15 days.

The patient was readmitted 8 months after discharge complaining of abdominal distress of recent onset. Abdominal examination revealed a well healed wound with no evidence of any mass. The temperature and pulse were normal. Repeated enemas showed small, hard fecal masses, but no blood or mucus. The red-cell and white-cell counts were both normal. No x-ray investigation was attempted because the patient's symptoms subsided and he was discharged.

Ten years after the second admission he began to have vague abdominal pain, referred chiefly to the region of the umbilicus, accompanied by occasional vomiting and obstipation. These symptoms persisted off and on for 6 weeks. X-ray examination revealed no abnormalities, and there was no evidence of intestinal obstruction from adhe-

## POLYPOSIS OF THE SMALL INTESTINE\*

## A Report of Five Cases

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SINCE 1930 there has accumulated considerable information about tumors of the small intestine. Polyps may be defined as any type of benign tumor having a pedicle either short or long, they may be solitary or multiple. This discussion, however, will be limited to polyps of the adenomatous type, in contradistinction to the polypoid tumor whose histologic structure classifies it as fibroma, fibromyoma, leiomyoma, hemangioma, lipoma, lymphoblastoma, cyst or inflammatory tumor.

Raiford,<sup>1</sup> in a thorough study of tumors of the small intestine, found 88 in 11,000 autopsies and 45,000 surgical specimens of cases treated in the Johns Hopkins Hospital, 50 were benign and 38 malignant. Saint,<sup>2</sup> Cave<sup>3</sup> and Joyce<sup>4</sup> have each reported a small series of tumors of the small intestine, including a few benign growths. Cooke,<sup>5</sup> in reporting 11 cases of carcinoid tumors of the small intestine, of which 3 had malignant lesions, defined two anatomic types—adenocarcinoma and carcinoid. The former he believes is commoner, but both are rare. It is evident from the description of the lesions in his series that certain of the benign tumors were polyps although termed carcinoid.

Adenoma is the commonest of all the benign tumors found in the small intestine. An analysis of the cases collected by Raiford<sup>1</sup> shows 15 adenomatous polyps, of which 4 underwent malignant degeneration. Such polyps constitute between 16 and 23 per cent of all benign tumors of the small bowel. The entire literature yields only 339 reliably reported cases, a figure arrived at by Raiford,<sup>1</sup> Rowe and Neely.<sup>6</sup>

In a study at the Rhode Island Hospital extending from January, 1929, to July, 1938, among 18,944 surgical specimens and 2795 postmortem examinations only 3 small-bowel lesions of this nature were found. Among the surgical specimens 1 polypoid tumor of the jejunum with malignant degeneration was reported, and the autopsies disclosed 1 case with a single polyp of the duodenum and 1 with polyposis of the entire gastrointestinal tract. We must conclude, therefore, that this is not a common pathologic entity.

Most writers agree that these tumors of the small intestine occur with greatest frequency in its lower segment. Their distribution is noted in Table 1. In our series 1 tumor had undergone malignant degeneration, a percentage comparable to the figures given by other investigators.

Age is a variable factor, and while these tumors appear to occur and recur in younger individuals, no age group is immune. The adenomatous types may be congenital. The necessity for reoperation in 2 cases of this series after the removal of a single

Table 1. *Distribution of Polypoid Tumors of the Small Intestine*

SITE OF TUMOR	AUTHORITIES		
	RAIFORD <sup>1</sup>	SAINT <sup>2</sup>	THIS SERIES
Duodenum	4	1	0
Jejunum	1	2	4
Ileum	10	10	2
Totals	15	13	6*

\*One case showed polyps in both the jejunum and ileum.

benign polyp indicates either the re-formation of this type of tumor or failure to remove all polyps at the time of the original operation. Occurrence does not appear to favor either sex, nor does race seem to be a factor.

The pathology is quite constant. Grossly the polyps vary in size from that of a marble to that of a plum and are very friable, differing little from other types. The mucous membrane is dark red and convoluted, and follows the general outline of the growth. The polyps present a mushroom-like appearance, and this fungating structure is also seen on section. The friable masses of glandular tissue projecting outward in finger-like processes at the periphery are lined with columnar epithelium and surround a central stalk-like portion of fibrous connective tissue coming directly from the intestinal wall.

The outstanding clinical feature of polyposis of the small intestine is the production of an intussuscepted mass. In Raiford's<sup>1</sup> series, this occurred in 23 per cent of the cases with benign tumors. In Joyce's<sup>4</sup> cases the percentage of intussusception was 30, and it happened much more frequently in benign than in malignant growths. In our own group intussusception occurred in every case. The mass is usually in the left side of the abdomen, and is solid but doughy and freely movable. It

of the bowel was re-established by an end-to-end anastomosis, and the abdomen was closed without drainage. The patient made an uncomplicated recovery and was discharged well in 21 days.

The pathological diagnosis was adenocarcinoma of the jejunum. Grossly the tumor presented a ragged, reddish yellow gray, mucoid, cauliflower like mass, measuring 8 cm. in its greatest diameter. Its base measured 3 cm. in the longitudinal plane of the bowel segment. Transversely it extended around the entire surface of the bowel wall. On section the polyp had a yellow gray granular appearance, with numerous small cavities containing yellow, cloudy, mucoid material. The mucosa of the bowel had a pinkish, glistening appearance and was not involved by the tumor mass. Microscopically the sections of the polypoid mass consisted of a branched fibrous connective tissue core, covered by columnar epithelium in which were seen many tall goblet cells. These were cylindrical and hyperchromatic. The epithelial tumor cells were arranged in a glandular manner and in cords, and varied in size and shape. Hyperchromatism was marked, and a few mitotic figures were seen. There were numerous mononuclear cells and lymphocytes, with a few plasma and polymorphonuclear cells in the fibrous connective tissue. In a few places the tumor extended into the muscle layer. The major part of the tumor mass showed a uniformity of cells and no mitotic figures.

*Case 4* M. M., a 15-year-old girl, was admitted to the hospital February 27, 1928, complaining of severe abdominal pain in the upper half of the abdomen, with nausea and vomiting, coming on immediately after breakfast. There had been no previous attacks. An enema gave good results, but despite this the pain increased in intensity. The past history was essentially negative. Abdom-



Figure 3 Case 5

*Barium meal film, showing several rounded areas of transparency that indicate the location of several of the polyps*

inal examination revealed a generalized tenderness with moderate distention. The entire left rectus was rigid, with tenderness shifting from the epigastrium to the left lower quadrant. The rectal examination was negative. The white cells numbered 25,200, with 85 per cent polymorphonuclears. The abdomen was explored 6 hours after the onset. An intussusception was found in the mid jejunum and required a resection of the mass, followed by a lateral anastomosis. The patient made a good convalescence and was discharged well on the 15th postoperative day. Pathologically the specimen showed a peduncu-

lated papillary adenoma of the polypoid type, with slight invasion of the intestinal mucosa. There was no destructive invasion of the muscular coat of the intestine, and no indication of frank malignant growth. The diagnosis was papillomatous adenoma.

*Case 5* C. K., an 18-year-old boy, was admitted to the hospital March 17, 1938, with a diagnosis of intestinal obstruction. He complained of cramp-like pain in the upper abdomen radiating from right to left. Nausea and vomiting had been severe for 24 hours. The vomitus was bile stained. There had been two normal bowel movements since the onset of symptoms. The pain was ag-



Figure 4 Case 5

*Another film showing polyps at various locations*

gravated by reclining. The past history revealed three similar attacks, the first occurring 12 months and the last 2 weeks before admission. The other attack, which had occurred 8 months previously, was marked by the same symptoms and the patient was then hospitalized. A barium enema was administered at that time, following which a mass in the left lower quadrant disappeared and the patient was discharged. No blood had ever been noted in the stools.

Physical examination at the present admission disclosed a tall, pale, young adult, well developed and nourished and in obvious distress. A palpable and visible, firm, slightly tender, sausage shaped mass in the left lower quadrant was the only abnormal finding. There was no spasm, but peristalsis was visible. A barium enema caused disappearance of the mass. Blood counts showed a consistently lowered red-cell count and a white-cell count of 18,500, with a preponderance of polymorphonuclears. The feces showed repeated positive tests with benzidine. X-ray studies on 3 different days were not informative. The diagnoses of recurrent intussusception, pelvic kidney, and internal hernia were considered, and an exploratory laparotomy was performed 1 week after admission. The left rectus was incised for a distance of 18 cm., with the midpoint at the level of the umbilicus. On opening the peritoneal cavity the following lesions were noted. Beginning at the angle of Treitz the jejunum was markedly thickened and swollen. Multiple polyps varying in size from that of a peanut to that of a lime were freely movable on their pedunculated bases within the lumen of the bowel. In the terminal 30 cm. of the ileum numerous similar polyps were also encountered extending to the ileocecal valve. Intussusception had taken place in portions of the bowel un-

sions In the 8th week of these attacks the patient was seen in consultation by the surgeon who had previously performed the operation At that time the abdominal pain was constant and intense. There was some distention on the left side of the abdomen, through which could be palpated a sausage shaped mass, tender and doughy The temperature was 98.6°F and the pulse 96 A diagnosis of recurrent intussusception was made and immediate exploration was advised. The abdomen was opened medial to the scar of the previous operation, and an intussusception of the ileum was found. The apex again was formed by a polypoid tumor in the intestine, the size of an English walnut. The same surgical procedure was



Figure 1 Case 5

*Barium-enema film, showing a pattern relief in the cecum strongly suggesting intussusception. Cecum is dilated, and no barium has entered the ileum*

followed as in the previous exploration—reduction of the intussusception and removal of the growth. The patient was discharged well on the 14th postoperative day. Five years after operation the patient was free of abdominal symptoms.

**Case 2** J. McR., a 12-year-old girl, was admitted to the hospital September 6, 1915. The onset of illness began with sudden pain throughout the abdomen, associated with vomiting. These symptoms persisted without interruption, and the bowels had not moved. The past history was non-contributory. Physical examination revealed a soft, elongated mass in the right lower quadrant, slightly tender and freely movable. The white-blood-cell count was 15,000. The urine was normal, and an enema disclosed no blood or mucus in the stool. A diagnosis of intussusception was made, and under ether anesthesia the abdomen was opened through a midline incision. A thick, swollen congested loop of jejunum was delivered into the wound and the intussusception was easily reduced. A polypoid mass was felt in the bowel at the apex of the intussusception. The bowel was incised and the mass, which proved to be a pedunculated polyp, was ligated at the base and removed. The bowel was sutured in its transverse diameter and the wound was tightly closed.

The pathological report described a soft, spongy mass the size of a walnut. On section it presented a dull gray surface, with several brownish streaks resembling the branching of a tree. Microscopically, the sections showed a large amount of fibrous tissue enclosing a hypertrophied glandular mass. The epithelial lining of some of the glands had undergone hyaline degeneration, with an increase in the cell pigment. The glands were tortuous, but there were no atypical cells. The diagnosis was adenoma.

The patient did well and was discharged at the end of 21 days.

On January 28, 1916, 4 months after the previous admission, the patient was readmitted with a diagnosis of intestinal obstruction. She had been well until 2 weeks previously, when a recurrence of abdominal pain, with vomiting, began and increased daily. Operation disclosed identical lesions. The intussusception was reduced, and three adenomatous polyps were removed. The pathological diagnosis was adenoma. The sections showed glandular tissue arranged around a central lumen and forming papillary projections from a connective tissue base. The patient was discharged well on the 20th postoperative day.

**Case 3** E. I., a 48-year-old, married woman, was admitted to the hospital February 11, 1938. Her illness had begun 10 years before, when she began to have intermittent epigastric pain almost daily. This usually came on about half an hour after meals and was relieved by reclining. Two weeks before admission the pain increased in frequency, duration and intensity, and was accompanied by almost continuous nausea and frequent vomiting. Physical examination disclosed a well-developed, slightly malnourished, pale woman. The blood pressure was 95/65. The skin was moist. Abdominal examination revealed a slightly tender, non-fluctuant mass about the size of a lemon, which moved freely to all quadrants except to the right upper. The mass appeared to be separate from the pelvic organs. There was no associated spasm. There was slight distention. A flat plate of the abdomen gave



Figure 2 Case 5

*Repeat barium-enema film in six days after previous enema, no longer showing any evidence of intussusception and thus indicating spontaneous reduction coincident with a moderate abatement of symptoms. The cecum shows an even, dense filling with barium*

no information. The red-cell count was 4,670,000 and the white-cell count 12,350, with 80 per cent polymorphonuclears. Occult blood was found in the stools on repeated examinations. The abdominal cavity was explored through a right rectus muscle splitting incision and the mass, felt abdominally, proved to be a tumor of the jejunum 30 cm. distal to the ligament of Treitz. This area was resected well beyond the visible tumor in both directions. Just within the lumen of the proximal end of the resected jejunum was seen a pedunculated mass. The tumor was easily removed after ligating its pedicle. The continuity

of the bowel was re-established by an end-to-end anastomosis, and the abdomen was closed without drainage. The patient made an uncomplicated recovery and was discharged well in 21 days.

The pathological diagnosis was adenocarcinoma of the jejunum. Grossly the tumor presented a ragged, reddish-yellow gray, mucoid, cauliflower like mass, measuring 8 cm. in its greatest diameter. Its base measured 3 cm. in the longitudinal plane of the bowel segment. Transversely it extended around the entire surface of the bowel wall. On section the polyp had a yellow-gray granular appearance, with numerous small cavities containing yellow, cloudy, mucoid material. The mucosa of the bowel had a pinkish, glistening appearance and was not involved by the tumor mass. Microscopically the sections of the polypoid mass consisted of a branched fibrous connective tissue core, covered by columnar epithelium in which were seen many tall goblet cells. These were cylindrical and hyperchromatic. The epithelial tumor cells were arranged in a glandular manner and in cords, and varied in size and shape. Hyperchromatism was marked, and a few mitotic figures were seen. There were numerous mononuclear cells and lymphocytes, with a few plasma and polymorphonuclear cells in the fibrous connective tissue. In a few places the tumor extended into the muscle layer. The major part of the tumor mass showed a uniformity of cells and no mitotic figures.

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Figure 4 Case 5

*Another film showing polyps at various locations*



Figure 3 Case 5

*Barium meal film, showing several rounded areas of transparency that indicate the location of several of the polyps*

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Physical examination at the present admission disclosed a tall, pale, young adult, well developed and nourished and in obvious distress. A palpable and visible, firm, slightly tender, sausage shaped mass in the left lower quadrant was the only abnormal finding. There was no spasm, but peristalsis was visible. A barium enema caused disappearance of the mass. Blood counts showed a consistently lowered red-cell count and a white-cell count of 18,500, with a preponderance of polymorphonuclears. The feces showed repeated positive tests with benzidine. X-ray studies on 3 different days were not informative. The diagnoses of recurrent intussusception, pelvic kidney, and internal hernia were considered, and an exploratory laparotomy was performed 1 week after admission. The left rectus was incised for a distance of 18 cm, with the midpoint at the level of the umbilicus. On opening the peritoneal cavity the following lesions were noted. Beginning at the angle of Treitz the jejunum was markedly thickened and swollen. Multiple polyps varying in size from that of a peanut to that of a lime were freely movable on their pedunculated bases within the lumen of the bowel. In the terminal 30 cm. of the ileum numerous similar polyps were also encountered extending to the ileocecal valve. Intussusception had taken place in portions of the bowel un-

der direct vision, this was caused by the polyps and was easily reduced. There were numerous enlarged lymph nodes in the mesentery, and there were several calcified nodes on the medial side of the head of the cecum. The extent of the polyps precluded resection or short-circuiting. A large polyp was removed from the jejunum, the intestine was closed and the abdominal wound was sutured in layers. The patient was discharged at the end of 37 days.



Figure 5 Case 5

*Ureteropyelogram showing infantile left kidney also an anomaly—spina bifida—of the first segment of the sacrum*

unimproved, with a diagnosis of multiple polyposis of the small intestine. The pathological diagnosis was an adenomatous polyp.

On April 7 barium meal studies of the gastrointestinal tract were made at 30-minute intervals. As the barium progressed through the small intestine there were noted a large number of rounded defects within the lumen of the jejunum and ileum, but there was no marked delay at any point. The x-ray findings indicated the presence of numerous small tumors of the small intestine, scattered from the jejunum to the terminal ileum without producing obstruction.

#### CONCLUSIONS

We believe that polyps of the small intestine are a relatively rare clinical entity and are of particularly important clinical significance, for the following reasons. They have a tendency to malignant degeneration and can produce an intestinal obstruction by intussusception. They can occur in any age group, and may be congenital. They apparently never attain sufficient size to cause obstruction by occlusion.

Preoperative diagnosis is difficult and not frequently made, because the early signs and symptoms may seem to the patient so insignificant that medical advice is not sought, and an acute abdominal crisis is usually the basis for the surgeon's

first contact. More careful roentgenologic study of the small bowel, especially in routine gastro-intestinal examinations when the signs and symptoms are obscure, may lead to early diagnosis and treatment. This will avoid the complications inherent in these polyps, namely malignant degeneration and the production of obstruction by intussusception.

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#### DISCUSSION

DR. HORACE K. SOWLES, Boston: We had an interesting case at the Massachusetts General Hospital, which brings

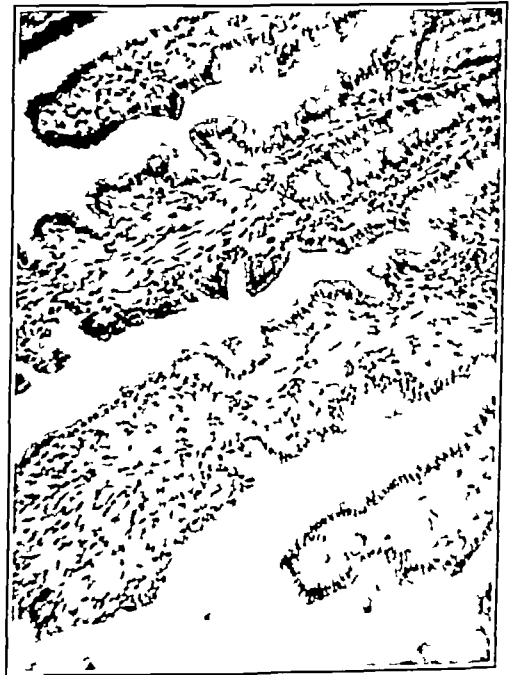


Figure 6 Case 5

*Low power photograph of removed polyp showing characteristic finger like projections lined with columnar epithelium*

out a question mentioned by Dr. Shaw, namely whether or not polyposis is a congenital disease. The patient was a married woman of forty. One child, a girl, had died of intussusception, which was caused by a polyp; she was operated on at the Children's Hospital but had not been sent there until the intestine had become gangrenous. A brother was known to have extensive polyposis, and her father had died of a disease which was probable polyposis or malignancy of the large bowel.

The patient had had symptoms for a long time. She had been a patient at the Boston City Hospital, with in definite gastrointestinal symptoms, a probable diagnosis of gall-bladder disease had been made there, but operation had not been advised. Like many patients with chronic disease who wander from one clinic to another, she appeared at our clinic with the same gastrointestinal symptoms, and one of the doctors in the X-ray Department, who has shown uncanny ability in picking up unusual gastrointestinal lesions, discovered multiple polyps in the small and large bowel. They were largely localized in the duodenum, but several were in the lower jejunum and upper ileum as well as in the large bowel.

Dr. Edward L. Young operated but resected no bowel. He made multiple incisions in the small intestine and excised eight polyps. The patient made a good recovery and went home, but came back four months later—in July, 1938. This time the case was taken over by Dr. Arthur W. Allen, who decided on a very radical operation because of the extensive polyposis which had been demonstrated in the large bowel. At this time no more polyps were found in the small bowel. Dr. Allen did an almost complete colectomy, removing the colon from the cecum down to the rectosigmoid junction, and doing an anastomosis of the terminal ileum to the rectum. One pedunculated polyp which remained in the lower segment of the rectum was removed from below through a proctoscope.

We think at the present time that all the lesions of the large bowel have been removed, with the possible exception of one in the lower rectum, which we intend to follow from time to time with the aid of a proctoscope. We cannot be absolutely sure whether or not there are any more polyps, either present or developing, in the small intestine. Since this seems an unusual and interesting case, the patient will be kept under observation.

DR. THOMAS H. LANNAN, Boston. Dr. Sowles brings up the question of a familial history and mentions a child who came to the Children's Hospital. We have

been encountering more of these polyps, not only in the large bowel but also in a surprising number in the small bowel. In 3 cases there has been a familial history.

In the case described by Dr. Sowles the child did come to the hospital with a gangrenous intussusception, and died there. Members of the house staff pointed out somewhat caustically that within twenty-four hours she had been at another hospital, and had been discharged with a statement that nothing was wrong. Their triumph was very short-lived, because in going over the old history it was found that the child had been a patient at the Children's Hospital and had been thoroughly examined, though nothing was found. On account of the vagueness of the symptoms, we even sent her to the Psychiatric Service as a 'problem child.'

We have been quite impressed with the vagueness of symptoms in these cases, and the question arises as to whether we have been overlooking a good many of them in the past. We have lately become convinced that a child who has these vague but persistent abdominal symptoms should receive most careful study, and should probably be explored.

DR. PETER P. CHASE, Providence. I should like to raise the question of the possible danger of excision of these polyps without an immediate pathological diagnosis. I realize that malignancy of the small intestine is very rare, but I had a case of this sort which was associated with intussusception. The growth was an adenocarcinoma, and it brings up the question of mistaking malignant polyps for benign ones.

DR. ALFRED M. ROWLEY, Hartford, Connecticut. The familial history of these cases makes one wonder what the exciting cause is. Embryonal influence does not explain it. Polyposis is common in Egypt and the Orient. I wonder whether amebiasis is the causative factor.

DR. SHAW (closing). I have nothing to add except to say that Dr. Chase's point is well taken. I believe that a frozen section should be done in all these cases because of their tendency to undergo malignant degeneration.

## REPORT ON MEDICAL PROGRESS

## GYNECOLOGY

JOE V MEIGS, M D \*

BOSTON

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## METHODS AND AIDS IN DIAGNOSIS

Endometrial biopsy has come to be of great importance in abnormalities of the menstrual rhythm and in work on sterility. Tissue can now be removed from the endometrial cavity in the office without anesthesia, or at least with a very short anesthesia, and the patient can be allowed to go home. There have been very few accidents subsequent to this procedure, the most upsetting of them being interruptions of pregnancy. Rarely is a septic process started. The biopsy may be taken with a small punch, a suction curette or a small, cup-shaped curette that can pass the internal os. A very small piece of tissue preserved in Zenker's solution or formalin, and stained, is sufficient to give the pathologist an opportunity to determine the stage of the endometrium. If taken a few days before the oncoming menstrual period it should show a secretory or functional phase. If this is not present and the menstrual period occurs shortly after the biopsy, it is evidence that a satisfactory ovulation with corpus-luteum formation has not occurred. This simple test may explain a menstrual abnormality, such as menorrhagia, or a problem of sterility. Multiple weekly biopsies in patients with abnormal flowing may give a clue to a delayed ovulation and thus explain the abnormal rhythm. Other irregularities of the men-

strual cycle can thus be determined and investigated after experience in the use of this simple method.

The necessity for careful charting of the menstrual cycle by the patient is obvious, for without accurate knowledge of the time of the period no correct observations can be made. This can be easily done with ordinary graph paper—each square representing a day of the cycle. With thirty-one squares allowed for each month, and each month given a line on the graph, a satisfactory chart can be made. It is surprising after charting a series of patients' periods to note how unusual it is for any given patient to have regular periods. Patients should be taught to keep accurate records, and these should be noted on the physician's chart so long as there is any problem.

The hysterometer is an important adjunct, and should be used to determine the proportionate size of the body of the uterus and cervix. It is not the size of the uterus that makes for normality, but the proportion of the body to the cervix. The hysterometer consists of a uterine sound measured in centimeters with a coiled spring, and a cuff that can be moved up and down on the shaft of the sound. It is advanced to the internal os and the length of the cervix is measured, it is then advanced to the top of the fundus and the length of the uterus and cervix is measured. Knowing these, it is a simple matter by subtraction to ascertain the length of the body of the uterus. The normal proportion between the lengths of the body and of the cervix is 2:1, the measurements of the juvenile or moderately underdeveloped uterus are the same for both, and in the infantile uterus the reverse of the normal holds true. These figures are only approximate, but in a patient with abnormal catamenia the added information as to whether the uterus is of normal or abnormal size is important. With the endometrial biopsy curette and the hysterometer, abnormalities of the ovaries and uterus are discovered. The ovary is the stimulator of an end organ, the uterus, and its activity is reflected in the endometrium and in the size of the uterus. Occasionally it can be assumed that an underdeveloped uterus with a normal endometrial cycle is due to a primary deficiency of the uterus itself.

The worth of the peritoneoscope is beginning to



be appreciated. In abnormal menstruation and sterility it is practical, for with experience, changes in the ovary can be visualized, and the question of whether or not ovulation has occurred can thus be determined without operation. It is conceivable that a corpus luteum may form without ovulation, and the peritoneoscope affords a means of determining more accurately whether or not it has taken place by inspecting the ovaries for the corpus and the pelvis for blood and coagulum. Peritoneoscopy is done through a small incision in the abdomen. A trocar is passed, the peritoneal cavity is inflated with air and the instrument is passed into the abdominal cavity. The pelvic organs may be easily and satisfactorily inspected. The air is allowed to escape after the inspection is over, and the patient is ready to go home the next day. In the presence of abnormal menstrual function and in sterility problems such a procedure is of considerable value.

The peritoneoscope is still more useful in other gynecological studies than those concerned with ovulation. With this instrument an accurate diagnosis of pelvic disease can be made. In most cases of pelvic tumors and pelvic lesions it is not necessary to subject the patient to such an investigation, for the need for operation is usually obvious, but there are problems, such as whether a pelvic tumor is an ovarian tumor or a uterine fibroid, where accurate knowledge is of distinct value. It would be a serious mistake to adopt watchful waiting for ovarian cancer, a policy which would be wise in some cases of symptomless fibroids. The question of tuberculous salpingitis and peritonitis versus cancer with abdominal metastases can be settled, for biopsies can be taken through the peritoneoscope, and the bleeding spot can be cauterized. There are many possible uses for this instrument, and its value for making accurate diagnoses in pelvic conditions is certain to increase.

Hormone determinations, for example those of the follicle-stimulating hormone (F.S.H.) of the pituitary gland, of estrin or theelin and of the anterior-pituitary-like hormone of pregnancy urine (P.U.H.), continue to be of value. In the menopause, in patients with complete ovarian failure, in pituitary failure and in pregnancy, mole and chorionepithelioma, they are important diagnostic aids. In the menopause and in ovarian failure estrin is absent and F.S.H. is present, while in pituitary failure both F.S.H. and estrin are absent. In pregnancy P.U.H. is present, and in persistent bleeding following the passing of a mole or following a normal pregnancy or miscarriage the finding of a large amount of P.U.H. is a most important factor in making the diagnosis of malignancy of the chorion.

Molimina or premenstrual symptoms such as weeping, painful breasts, vaginal discharge, cramps, backache, change in disposition, and so forth constitute valuable evidence of ovarian activity. If a patient has molimina, estrin is present, and if she has cramps, ovulation has usually taken place. Thus in addition to the biological assay of urine, endometrial biopsy and so forth there is a simple method of detecting ovarian activity. Only recently has sufficient attention been paid to such symptoms.

Hirsutism may mean a great deal or very little. If present from childhood or if occurring in a hirsute family it is of but little consequence, but its sudden appearance may mean much. When it is accompanied by other symptoms such as amenorrhea or genital or breast atrophy, increase in the size of the clitoris, and so forth, a diligent search must be made for a tumor of the pituitary gland, adrenal gland or ovary. There are as yet no differential tests which enable one to separate these three lesions, but glucose tolerance tests, F.S.H. and estrin determinations, intravenous pyelograms, x-rays after the injection of air into the perirenal and periadrenal areas and peritoneoscopy are of value.

Congenital erosion of the cervix—the strawberry-red area the size of a ten-cent piece so often seen in nulliparas around the external os—is a valuable physical finding. It usually means that the uterus is not well developed, for this is a stigma of underdevelopment. The red area is made up of exposed endocervical glands. These are normally in the cervical canal, with the outside of the cervix covered with squamous epithelium. This lesion is often found in patients with sterility, dysmenorrhea or endometriosis. Its presence at once suggests that any pelvic abnormality may be due to underdevelopment or underfunction.

The colposcope is another instrument of considerable practical value. It consists of a bifocal microscope on a stand. It magnifies the outside of the cervix ten times, and gives the observer an excellent view of abnormalities of the cervical epithelium. Thus cysts of Naboth, exposed ducts of the endocervical glands and areas of leukoplakia, areas of pseudo-healing and abnormal epithelium can be easily detected. The colposcope when used in conjunction with Schiller's Lugol-solution test helps to identify early lesions of the cervix which may be dangerous. Most cervical tissue that does not stain with iodine is found to be an area bare of epithelium, one of chronic inflammation or one of hyperkeratosis or perhaps cancer. If biopsies are continuously taken from such areas, sooner or later small cervical cancers will be found. The

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The worth of the peritoneoscope is beginning to

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child undergoing treatment. It is well known that the adult vagina is rarely affected by the gonococcus, therefore if an adult state can be produced in a child, relief may be expected. This has proved to be the case, and all specific vaginitis in children should be so treated. Occasionally during treatment with estrin, breast development is started, but they revert to normal after cessation of treatment. The best method of treatment is to use children-size estrin suppositories every other day and to observe changes in the vaginal epithelium and in the number of gonococci present in the smear. The injection of at least 100 rat units of estrin in oil daily is safe, if this dose is not sufficient, it should be increased. Observance of the changes in the vaginal epithelium is most essential in the proper treatment of this condition.

Sulfanilamide is of value in the treatment of gonorrheal infections. Local infections of the urethra, Bartholin's glands, or cervix respond favorably, but infected tubes do not. Doses of 60 to 120 gr daily for at least seven days are essential, followed by smaller doses for at least another week or ten days. Smears must be taken frequently in order to check the presence or absence of the gonococcus, for sometimes the organism recurs even after satisfactory treatment. The morphology of the gonococcus changes during treatment, and its recognition in smears may be impossible. Cultures are of extreme importance, and it is essential that the culture media be freshly made on blood or ascitic meat-infusion agar and kept at body temperature. The agar plates must be returned to the laboratory for incubation immediately after inoculation. Successive negative cultures must have been obtained before a patient can be considered relieved of her gonorrhea.

Senile vaginitis is due to infections occurring in atrophied vaginal epithelium. Atrophic epithelium, like the epithelium of the very young, does not resist infection, and trauma may easily lead to superficial infection and ulceration. The method of treatment is to change the senile state of the epithelium to a normal adult one. This can be done by using suppositories of estrin (2000 and 3000 rat units) every other day, or even less frequently. The effect can be easily checked by vaginal smears, they should show the replacement of transitional or rounded epithelial cells by squamous or squared cells with nuclei. Pus disappears from the smear, and bacteria vanish. The vaginal estrin may be reinforced by estrin given orally or hypodermically in large or small doses, as necessary to change the cells to the normal adult type.

Pruritus vulvae and leukoplakial vulvitis are as a rule due to infections in non resistant atrophied

vulval tissues. This atrophy is caused by a lack of the ovarian hormone, and the use of the latter is recommended as treatment. Often these difficult and persistent lesions clear up if vaginal suppositories are used in addition to estrin given orally or hypodermically. It is best to use large doses at first, reducing them as relief is obtained. For intractable pruritus, alcohol injected into the periphery of the lesion is valuable. It is suggested that two minims of 95 per cent alcohol be injected in areas 0.6 to 1.0 cm apart at the periphery of the area of pruritus. Not over 10 or 20 cc of solution should be injected at any one time. This is not an office procedure but a hospital one, considerable swelling of the vulva may occur and it may remain painful for some time. Sloughs are not unknown. It has been suggested that section of the nerves that supply the skin of the vulva is valuable. This method is also of distinct merit in cases of kraurosis, as a resultant increase in blood supply relieves the atrophic condition. The pudendal and perineal nerves are resected, the absence of pain, burning and itching relieves the necessity for scratching, and this clears up the mild infection. In obstinate cases it may be necessary to do a vulvectomy. This is a minor procedure and can be done in a very short time, and the relief obtained is instantaneous. However, it must be remembered that along the edge of the incision the same process sometimes reappears, and in a few months or years the condition may be the same as ever. Surgery, alcohol injection, nerve section and hormone treatment are all possible in the treatment of severe itching and skin changes of the vulva.

Chronic endocervicitis is often not due to the gonococcus but the secondary invaders which infect the deep and branching cervical glands, plugging the ducts and causing the formation of cysts (cysts of Naboth). The process is often so extensive that nothing short of total hysterectomy suffices to cure it. In some cases linear cauterization of the cervix is the proper treatment, in others with deeper penetration Hyams's method of conization is the best procedure. Hyams uses a triangular wire on an electrode of the endothermy apparatus. With a cutting current a cone of cervix is removed. Healing is complete in about six weeks, a fresh cervical epithelium is present and most of the low endocervical glands have been destroyed. This is a simple method, but the possibility of hemorrhage on or about the tenth day must be thought of, as well as infection and, last and most important, cicatricial stenosis of the cervical canal. The latter means constant dilatation of the os or total removal of the cervix or entire uterus so as to keep the patient comfort-

white, raised plaque found at the junction of the squamous and endocervical epithelium, if it does not stain with Lugol's solution and is opaque and dull, is a dangerous area, and a real biopsy, not a mere scraping of the superficial epithelium, should be carried out at once. There is at present no instrument that will satisfactorily remove cervical biopsy material in the office, and it is not to be wondered at that early cervical cancers are not oftener found and cured. There is no doubt of the worth of these two methods of investigation, the Schiller test is simple and the colposcope, while at present of value only to the expert, will prove more valuable as additional physicians are trained in its use.

A proper solution for the Schiller test is as follows: iodine, 2 parts, potassium iodide, 4 parts, distilled water, 300 parts. It can be applied by means of a heavily soaked cotton pledget, a spray or a medicine dropper. The cervix must be cleared of mucus and must not bleed. The solution rarely causes any burning sensation. It should be left on the cervix for at least five minutes, and the excess should be removed without trauma.

#### INFLAMMATIONS

By far the commonest cause of vaginal discharge is *Trichomonas vaginalis*. This flagellate causes an irritating discharge with a characteristic pungent odor. Usually the discharge is yellow-green and contains air bubbles, it causes a disagreeable sensation in the vagina and is often accompanied by irritation of the vulva and the insides of the thighs. An accurate diagnosis is easily made by microscopic examination. The best method is to place a drop or two of the discharge on a slide, mix it with two or three drops of warm tap water, cover the mixture with a coverslip and examine it under the 4 mm lens of the microscope with the light cut down about one half. In such a slide squamous epithelium, pus cells and bacteria are seen, and often in the midst of such structures a few or many organisms of the size of a pus cell are found jerking and moving about, sometimes from side to side, sometimes in circles, close observation will disclose small, whip-like flagella which are responsible for the motion. Occasionally a phagocytizing leukocyte full of active bacteria is confusing, but on further observation it will be obvious that the motion is on the inside and not on the outside. Once the diagnosis is made, — and this is easy after a little experience, — treatment should commence. As any douche kills most of the organisms, and as most patients take a douche before visiting the office, it is frequently necessary to ask them to return at a time when they have made no attempt

to get rid of the discharge, this point should be remembered whenever a patient complains of a discharge. In spite of the fact that almost any kind of douche destroys the organisms, they reappear when the irrigations are stopped. Treatments of this type will not cure the disease. Since the flagellates are frequent inhabitants of the gastrointestinal tract, it is essential to advise the patient that the anus be wiped carefully with moist tissue or cotton from vagina to rectum, in order to avoid contaminating the former with feces. In persistent cases the bladder must be investigated, since trichomonas sometimes grow there, and if the patient is married, the husband must be examined, for he may be a carrier.

The most successful method of treatment is the use of Stovarsol in a powder-blower once a week, and douches of sodium perborate — one tablespoonful to one quart of warm water daily. Silver picrate powder in a blower and silver picrate suppositories are also satisfactory. If these methods fail, Stovarsol insufflations may be tried every day throughout the month, including the days of menstruation. Persistence is essential. Occasionally a few treatments suffice, but usually the treatment is long and recurrences are frequent. Patients should return two or three days after each menstrual period without having had any form of medication, and be examined for the organism. This is the time when it is most likely to be present. The condition is easy to relieve, but it is difficult to rid the patient permanently of this disagreeable vaginal parasite.

Monilia, a branching form of yeast, also causes a vaginal discharge and irritation, and the diagnosis is best made by culture. The discharge is irritating and watery and contains flecks of white fibrin. The discharge is usually typical, but a culture is the safest way to be sure of the diagnosis. Monilia is a frequent cause of discharge and vulvitis in diabetic patients. Treatment consists of the care of the diabetes, if present, cleanliness, warm alkaline douches and frequent painting of the vagina and vulva with a 1 or 2 per cent aqueous solution of gentian violet. Other yeasts occasionally cause persistent irritating discharge, and a more frequent use of cultures aids in making clear the etiology. The treatment is the same as for monilia.

Vulvovaginitis of gonorrheal origin in children is aided by the use of estrin, in vaginal suppositories, by injection or by mouth. The rationale of such treatment is the change of the non-resistant transitional epithelium of the prepubertal vagina to the gonococcus-resistant squamous epithelium of adults. Such a change can be observed microscopically by taking occasional smears from a

its own confines, surgery should be conservative, otherwise radical

For all the above tumors of the ovaries and tubes, x-ray treatment helps to relieve symptoms and prolong life but does not destroy the lesion

It has long been known that fibroma of the ovary is often accompanied by ascites, but until recently it was not known that pleural effusion might also be present in this condition. Cases with this syndrome are now being reported. It is important for all to realize that because a patient has a tumor in her pelvis with fluid in the abdomen and chest it is not necessarily malignant, it may be benign. In unexplained pleural effusion a careful search should be made in the pelvis for an ovarian tumor. The mechanism of the fluid in the chest is not known, but that it occurs is certain.

Endometriosis is very common, and great care must be used in inspecting the pelvis and marking specimens for the pathologist. Small, dark-blue to black spots on the uterus, ovaries, uterosacral ligaments, pelvic peritoneum or intestines, or a posterior cul-de-sac that is drawn up onto the back of the uterus, means endometriosis. Pregnancies are frequently reported following conservative surgery. If conservation of the ovaries is desired it is necessary to remove all visible areas of disease. Endometrial tumors of the rectosigmoid are not uncommon and are frequently confused with cancer. If endometriosis is suspected the pelvis and more especially the ovary should be searched for areas of the disease. If confirmatory lesions are not found and the diagnosis is in doubt, a colostomy that can eventually be closed and replaced in the abdomen is the proper operative procedure. If possible, resection and suture should be carried out if the actual diagnosis cannot be made. If an endometrioma is causing obstruction or partial obstruction, temporary colostomy with removal of the ovaries will allow atrophy of the tumor to take place, just as ovarian excision or the normal menopause causes atrophy of the endometrium.

Simple cysts of the ovary do not justify its removal. If it is possible to excise a cyst and reconstruct the ovary, or even to puncture a cyst, it is much wiser to do so than to remove the ovary. Removal of a gonad in a young girl often turns out to be a very unwise procedure. Following unilateral ovariectomy, abnormal bleeding, anovulatory cycles and menstrual upsets often occur. Such patients are frequently sterile, and a process of operative procedures often follows.

These small cysts may be atretic or disappearing follicles, or may be persistent follicle cysts. Such

cysts are indicative of abnormal physiology, not tumors. Rupture or puncture or excision is sufficient treatment. Their presence is not an indication for ovariectomy, but quite the contrary.

The diagnosis of hydatidiform mole and chorion-epithelioma is made easier by the realization that a persistent Aschheim-Zondek test following abortion, mole or normal pregnancy means abnormality. If such a test is a strongly positive one and if a large amount of P U H is found, chorion-epithelioma should be suspected, if symptoms of bleeding persist, radical surgery should be done at once. The study of hormones has increased our ability to attack the problem of abnormal growth of the chorion.

#### STERILITY

The use of a hystrometer to determine the normal or underdeveloped uterus, and that of endometrial biopsy to determine whether ovulation occurs and about when, are advances in the study of sterility. The use of daily rectal temperatures helps to determine the date of ovulation. A drop in morning temperature about the middle of the menstrual cycle probably indicates follicle rupture. Uterine insufflation and the injection of lipiodol to determine tubal patency and to picture the inside of the uterine cavity and tubes are of value. A well-balanced diet with a normal amount of protein, carbohydrate and fat must be given. The rhythm is of extreme importance. It is not yet possible to say that only one ovulation occurs per cycle and that it occurs just two weeks before the oncoming period, but it probably does. It is possible to set the probable date of ovulation fairly satisfactorily. This is done by taking the shortest time and the longest time in days between the onset of periods and subtracting fourteen days from each. For safety's sake it is best to take three days off the smaller figure and add two days to the longer. This gives an interval during which ovulation probably takes place. Thus if the short interval were twenty-four days and the long interval thirty days, subtracting fourteen days from each would give ten and sixteen days respectively. Taking three from ten and adding two to sixteen would give seven and eighteen days as the most probable ones for ovulation and impregnation. Intercourse should be limited to these days, if pregnancy is desired. Occasionally between periods there is a menstrual like pain or gas pain known as *Mittelschmerz*. Sometimes there is a small flow, *kleine Regle*, at about the same time. These two phenomena probably denote the approximate time of ovulation and that when impregnation is most likely to occur.

able Pelvic cellulitis following any cauterization of the cervix may be extremely serious. Cauterization of a very shallow type is excellent treatment for exposed endocervical epithelium without deep infection. High amputation of the cervix can be done for endocervicitis, but the higher the amputation the greater the danger during pregnancy and the more chance of stenosis and poor function. If the endocervicitis is persistent and simple measures do not relieve it, total hysterectomy must be performed.

Pelvic inflammation of the gonorrheal or puerperal type should be treated as usual rest in bed, pelvic heat, hot douches, sitz baths or the Elliott method of constant dry heat. Radical surgery should be avoided in acute cases with peritoneal irritation, pelvic and broad-ligament abscesses should be evacuated by simple drainage. When chronic inflammation is persistent, surgery should be carried out, and should be radical, for conservative pelvic surgery in these cases usually leads to dysmenorrhea, menorrhagia and other annoying pelvic disorders. If both tubes are excised, the uterus and cervix should be removed, if the patient's condition is satisfactory. If the genitalia can be preserved they should be in girls and young women, but in older patients radical surgery is best. The use of sulfanilamide in pelvic inflammation has not been completely successful, although certain reports are encouraging. In puerperal sepsis due to the hemolytic streptococcus it should certainly be used, and because of its action on the gonococcus its employment in gonorrheal inflammations seems logical.

#### TUMORS

The treatment of cervical cancer is best carried out by means of combined x-ray treatment plus moderate doses of radium. It is apparently better to combine the two than to use radium alone. X-ray treatment causes a diffuse fibrosis about the tumor and can be given in doses sufficient to kill tumor cells. This effect combined with local treatment of the cervix with radium is satisfactory. Surgery still continues to have advocates, but the operation must be done in early cases and must be one of the radical Wertheim-Clark type. Radium has now been in successful use for twenty-five years, but there are still those who advise surgery. Surely it is unwise unless carried out very radically and very expertly.

Cancer of the fallopian tube is commoner than supposed, and should be considered in the differential diagnosis in women with pelvic masses and bleeding near, at or after the menopause. The lesion occurs oftenest in relation to old pelvic in-

flammation and hydrosalpinx, but may occur as a simple tumor of the tube alone. Its characteristic symptom is that of bleeding from the uterus. Curettage is usually negative. This tumor bleeds into the endometrium and not from it. It should always be considered after the menopause when no curettings are obtained.

Cancer of the ovary has been demonstrated to be a highly malignant and not a common tumor. The results of treatment are exceptionally poor, yet from the nature of the tumor it should be easy to diagnose and remove. Any mass in the adnexal region should be considered as ovarian cancer until proved otherwise. If it is present radical surgery should be carried out. In both tubal and ovarian cancer, because of the possibility of the ovary, uterus and cervix being involved, total hysterectomy with bilateral salpingo-oophorectomy should be the operative procedure.

Tumors with endocrine significance are not uncommon and should be thought of in connection with ovarian masses, especially when there are changes in the patient's physical characteristics and symptoms of abnormal bleeding are present. The granulosa-cell tumor is the commonest endocrine one of the ovary. It is of a moderate degree of malignancy. This tumor may be responsible for both amenorrhea and abnormal uterine bleeding. It is frequently the cause of precocious puberty and bleeding after the menopause, and should always be thought of in connection with these two problems. Simple removal of the tumor is usually all that is necessary, but if there is any evidence of extension, radical surgery and x-ray treatment should be carried out. The dysgerminoma has no real endocrine significance but is often present in patients with poor genital development. A small vagina or an infantile uterus or both may be present in a patient with this tumor. The dysgerminoma in women is similar histologically to the seminoma of the testicle, but is not so malignant. If this tumor, a rounded, solid one made up of large round cells and often confused with rapidly growing cancer, is present in a young woman, conservative surgery should be practiced unless the tumor is bilateral or shows signs of invasion. If the tumor is within its capsule, conservative surgery should be done, otherwise radical. The arrhenoblastoma (from *arrhenos*, meaning "male") is a tumor of the ovary that secretes the male hormone and is responsible for progressive changes toward masculinity. It is usually unaccompanied by changes in the blood pressure or obesity, but does cause hirsutism, male voice, atrophy of breasts, large clitoris, striae, amenorrhea, and so forth. This tumor is somewhat malignant, but if it is within

its own confines, surgery should be conservative, otherwise radical

For all the above tumors of the ovaries and tubes, x-ray treatment helps to relieve symptoms and prolong life but does not destroy the lesion

It has long been known that fibroma of the ovary is often accompanied by ascites, but until recently it was not known that pleural effusion might also be present in this condition. Cases with this syndrome are now being reported. It is important for all to realize that because a patient has a tumor in her pelvis with fluid in the abdomen and chest it is not necessarily malignant, it may be benign. In unexplained pleural effusion a careful search should be made in the pelvis for an ovarian tumor. The mechanism of the fluid in the chest is not known, but that it occurs is certain

Endometriosis is very common, and great care must be used in inspecting the pelvis and marking specimens for the pathologist. Small, dark-blue to black spots on the uterus, ovaries, uterosacral ligaments, pelvic peritoneum or intestines, or a posterior cul-de-sac that is drawn up onto the back of the uterus, means endometriosis. Pregnancies are frequently reported following conservative surgery. If conservation of the ovaries is desired it is necessary to remove all visible areas of disease. Endometrial tumors of the rectosigmoid are not uncommon and are frequently confused with cancer. If endometriosis is suspected the pelvis and more especially the ovary should be searched for areas of the disease. If confirmatory lesions are not found and the diagnosis is in doubt, a colostomy that can eventually be closed and replaced in the abdomen is the proper operative procedure. If possible, resection and suture should be carried out if the actual diagnosis cannot be made. If an endometrioma is causing obstruction or partial obstruction, temporary colostomy with removal of the ovaries will allow atrophy of the tumor to take place, just as ovarian excision or the normal menopause causes atrophy of the endometrium

Simple cysts of the ovary do not justify its removal. If it is possible to excise a cyst and reconstruct the ovary, or even to puncture a cyst, it is much wiser to do so than to remove the ovary. Removal of a gonad in a young girl often turns out to be a very unwise procedure. Following unilateral ovariectomy, abnormal bleeding, anovulatory cycles and menstrual upsets often occur. Such patients are frequently sterile, and a procession of operative procedures often follows

These small cysts may be atretic or disappearing follicles, or may be persistent follicle cysts. Such

cysts are indicative of abnormal physiology, not tumors. Rupture or puncture or excision is sufficient treatment. Their presence is not an indication for ovariectomy, but quite the contrary

The diagnosis of hydatidiform mole and chorion-epithelioma is made easier by the realization that a persistent Aschheim-Zondek test following abortion, mole or normal pregnancy means abnormality. If such a test is a strongly positive one and if a large amount of P U H is found, chorion-epithelioma should be suspected, if symptoms of bleeding persist, radical surgery should be done at once. The study of hormones has increased our ability to attack the problem of abnormal growth of the chorion

#### STERILITY

The use of a hystrometer to determine the normal or underdeveloped uterus, and that of endometrial biopsy to determine whether ovulation occurs and about when, are advances in the study of sterility. The use of daily rectal temperatures helps to determine the date of ovulation. A drop in morning temperature about the middle of the menstrual cycle probably indicates follicle rupture. Uterine insufflation and the injection of lipiodol to determine tubal patency and to picture the inside of the uterine cavity and tubes are of value. A well-balanced diet with a normal amount of protein, carbohydrate and fat must be given. The rhythm is of extreme importance. It is not yet possible to say that only one ovulation occurs per cycle and that it occurs just two weeks before the oncoming period, but it probably does. It is possible to set the probable date of ovulation fairly satisfactorily. This is done by taking the shortest time and the longest time in days between the onset of periods and subtracting fourteen days from each. For safety's sake it is best to take three days off the smaller figure and add two days to the longer. This gives an interval during which ovulation probably takes place. Thus if the short interval were twenty-four days and the long interval thirty days, subtracting fourteen days from each would give ten and sixteen days respectively. Taking three from ten and adding two to sixteen would give seven and eighteen days as the most probable ones for ovulation and impregnation. Intercourse should be limited to these days, if pregnancy is desired. Occasionally between periods there is a menstrual-like pain or gas pain known as *Mittelschmerz*. Sometimes there is a small flow, *kleine Regle*, at about the same time. These two phenomena probably denote the approximate time of ovulation and that when impregnation is most likely to occur

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The treatment of the menopause by estrin is most satisfactory. The hormone can be given by intramuscular injection, by mouth or by vaginal suppository. It is decidedly more efficacious by injection, but oral administration is good. The proper way to treat patients is to give large doses (10,000 rat units) biweekly at first, and to cut the dosage down as low as possible when relief is obtained. Estrin is helpful in premenstrual tension, dysmenorrhea, night sweats, dizziness and even in involutional melancholia. There is no doubt as to its worth in various complaints of women at the menopause.

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cient in functional bleeding, frequent curetting often helps, and eventually a proper rhythm is resumed. If hormone treatment and curettage fail, hysterectomy is the method of choice in women between the ages of thirty-five and forty-five, and radium and x-ray treatment in older women. Hysterectomy is advocated in young women because ovaries can be left and normal function will occur until the patient's menopause arrives. This has been shown to be five years or more in a large majority of cases. Removal of the uterus does not injure the ovaries, and they will continue to function normally if their blood supply is not interfered with, but tension on the ovarian artery must be avoided.

Postmenopausal bleeding means cancer in all cases until proved otherwise. Careful curettage and microscopic examination of the curettings are absolutely necessary. The peritoneoscope may be used to determine the presence or absence of ovarian or tubal tumors. The commonest causes of such bleeding are cervical and endometrial cancer, but tumors of the ovary, both benign and malignant, may be responsible, as may polyps of the cervix or endometrium. It is unwise to give radium to women who bleed after the menopause until the actual cause of the bleeding has been determined. Radium often causes obliteration of the uterine cavity, and endometrial cancer in the region of a cornu, or undiagnosed ovarian or tubal tumors, may grow until cure is out of the question. In unexplained postmenopausal bleeding it is best to wait after a curettage. If bleeding does not take place, well and good, if it does, surgical and not radiological treatment is best.

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outer side of the cervix, and are then carried over the cervix and into the corresponding tissue of the opposite side. They are tied tightly in front of the cervix. Pulling these tissues together in front of the cervix pushes it back and the body of the uterus up. If three or four sutures are inserted and tied, prolapse is relieved and retroversion reduced. This is especially noticeable when the ligaments retreat. The operation successfully accomplishes its aim. In addition to the cardinal ligament sutures, the fascia of the anterior vaginal wall is sutured over the bulging bladder and the thick pubocervical fascia is anchored higher up on the cervix. The perineum is then repaired in the usual manner. This operation is easy to do, takes very little time and is successful in most cases. It can be used with or without amputation of the cervix, but usually the cervix is removed. It is said by the Manchester group that pregnancy is not interfered with—or very little, if the cervix is not amputated—and that therefore sterilization is not necessary. The operation can be done in a younger age group than can the interposition operation.

In old women, unmarried women or those who are not good risks for the extensive surgery, the La Fort operation is popular. This consists of the removal of a rectangle from the anterior and posterior vaginal walls. The two raw surfaces are sutured together over the cervix, which may or may not be amputated. The last line of sutures is just below the urethra and at the perineal outlet. Thus tubes which reach to the cervix for drainage are left on either side of the vagina. This operation partially closes the vagina and prevents satisfactory intercourse. The perineum is then repaired in the usual fashion.

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#### MISCELLANEOUS

Pain in the pelvis due to recurrent cancer, provided it is not due to lesions of the kidney, is well controlled for weeks to months by the injection of absolute alcohol intraspinaly. This can be done in two ways: with the patient on her side and hips raised and the injection made first for one side of the cord and later for the other, or with the patient lying on a table with the buttocks up and the head and feet down. By this method both sides of the cord are anesthetized at the same time. If the pain is not relieved by injection, cordotomy, either unilateral or bilateral, may be done. Cordotomy gives permanent relief but removes the sense of temperature as well as pain. As in alcohol injection, pain due to kidney disease is not relieved.

In cancer of the cervix it is important to determine the condition of the kidneys before, during

and after radiation. There can be no doubt that many patients have died of uremia who might have been saved by prompt and intelligent urological treatment. Pain due to renal difficulty may be of any type and in any part of the lower abdomen or thighs. Recognition and treatment of blocked ureters and hydronephroses by dilatation of the ureter or nephrostomy will relieve pain almost instantaneously.

The Gellhorn pessary, which is mushroom shaped and can be removed and replaced by the patient, has proved of great value in the treatment of prolapse, with or without cystocele and rectocele. The mushroom top is cupped and this causes a moderate amount of suction, so that a small pessary can be used. The handle (the stem of the mushroom) makes it easy for the patient to remove and replace the pessary, and also helps to keep it high up in the vagina, especially when sitting.

#### SUMMARY

A brief review of many of the recent advances in gynecology has been presented. They have been briefly described, but further reading on each subject will be necessary to appreciate them fully. Other probable advances have been omitted, since they have not, as yet, been proved to be of practical value.

Surgery, radiology and hormonology apparently constitute the specialty of gynecology.

## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25061

#### PRESENTATION OF CASE

A forty-seven-year-old American housewife entered complaining of a brown vaginal discharge of six weeks' duration.

Four years prior to admission she had had a miscarriage during the third month of pregnancy. Following this the duration of the periods increased from five to seven days and the flow became much more profuse. However, her catamenia remained regular, with no staining or discharge between menses. Six weeks before entry she missed her regular period and noticed instead the beginning of a brown vaginal discharge. This continued for a month with the exception of cessation for a few days following treatment with douches. Two weeks before admission there was a discharge of bright-red blood which lasted all day but it did not resemble the normal menstrual flow. The brownish discharge again followed, continuing to the day of entry. The discharge was never profuse, and she had not felt faint. Six days before entry she noted the onset of mild cramp-like pains in the lower abdomen. They were felt on both sides and occurred intermittently. Three days later they became more severe and resembled labor pains, starting in the back and radiating around to the midlower abdomen, almost reaching the stage of "bearing down" pains. During these last six weeks she had noticed slight nausea and her breasts had become somewhat painful.

She had diabetes, discovered four months prior to entry. She had had nine pregnancies, and seven children living and well.

Physical examination showed an obese woman. Examination of the chest was negative. The blood pressure was 130 systolic, 85 diastolic. In the midlower abdomen a firm, tender, symmetrical mass that extended to within 1 cm. of the umbilicus was palpated. It resembled a uterus in the sixth month of pregnancy. Pelvic examination showed that the cervical os pointed posteriorly. The mass mentioned was freely mobile and attached to the cervix. The cervix was firm, not soft or patulous. After palpation the cervix began bleeding profusely.

The temperature was 99°F, the pulse 85, the respirations 20.

The urine examination showed a trace of albumin and innumerable red blood cells. The blood showed a red-cell count of 3,310,000 with 72 per cent hemoglobin, and a white-cell count of 14,600. A blood Hinton test was negative.

On the day after admission the patient lost 1500 cc. of blood by vagina. The blood pressure neared shock levels before transfusion brought relief. On the second hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. JOE V. MEIGS: This case is a great puzzle to me. There are so many possible diagnoses that it is very difficult to limit it to any one. When a woman bleeds at the age of forty-seven for six weeks and has a brownish discharge one wants to know whether it is really blood or just a discharge. I take it in this case that it was blood. She had had a miscarriage four years before, when forty-three years old. Following this her periods increased so that they lasted from five to seven days, and the bleeding became profuse. As a woman reaches the menopause, her periods frequently increase in duration and amount, however, sometimes the reverse is true.

"Six weeks before entry she missed her regular period and noticed instead the beginning of a brown vaginal discharge." I do not know exactly what that means—whether she went six weeks and then a discharge started up or whether she missed the period and started to bleed. If she skipped a period it might mean one thing, if she bled abnormally at the regular time it might mean something else. The facts that she had labor pains and was nauseated, that she had changes in the breasts and that the uterus was in the midline, symmetrical and consistent with pregnancy make one think, coupled with her history, that she had an abnormal pregnancy of some sort. On the other hand, patients approaching the menopause do have changes in their breasts, and we have noticed in the Endocrine Clinic here and at the Huntington Memorial Hospital that many patients at this time commence to have discomfort and pain in the breasts. The facts that the cervix was firm and hard and not patulous and that she was bleeding make one wonder if she was miscarrying the abnormal pregnancy. However, I think that this particular observation may not have been correct. The cervix may have been softer than normal and still have felt fairly firm. The question as to why the cervix should have bled after palpation I cannot answer. One thinks of carcinoma of the cervix, but the history would have been more obvious.

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#### SUMMARY

A brief review of many of the recent advances in gynecology has been presented. They have been briefly described, but further reading on each subject will be necessary to appreciate them fully. Other probable advances have been omitted, since they have not, as yet, been proved to be of practical value.

Surgery, radiology and hormonology apparently constitute the specialty of gynecology.

## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25061

#### PRESENTATION OF CASE

A forty-seven-year-old American housewife entered complaining of a brown vaginal discharge of six weeks' duration.

Four years prior to admission she had had a miscarriage during the third month of pregnancy. Following this the duration of the periods increased from five to seven days and the flow became much more profuse. However, her catamenia remained regular, with no staining or discharge between menses. Six weeks before entry she missed her regular period and noticed instead the beginning of a brown vaginal discharge. This continued for a month with the exception of cessation for a few days following treatment with douches. Two weeks before admission there was a discharge of bright-red blood which lasted all day but it did not resemble the normal menstrual flow. The brownish discharge again followed, continuing to the day of entry. The discharge was never profuse, and she had not felt faint. Six days before entry she noted the onset of mild cramp-like pains in the lower abdomen. They were felt on both sides and occurred intermittently. Three days later they became more severe and resembled labor pains, starting in the back and radiating around to the midlower abdomen, almost reaching the stage of "bearing down" pains. During these last six weeks she had noticed slight nausea and her breasts had become somewhat painful.

She had diabetes, discovered four months prior to entry. She had had nine pregnancies, and seven children living and well.

Physical examination showed an obese woman. Examination of the chest was negative. The blood pressure was 130 systolic, 85 diastolic. In the midlower abdomen a firm, tender, symmetrical mass that extended to within 1 cm. of the umbilicus was palpated. It resembled a uterus in the sixth month of pregnancy. Pelvic examination showed that the cervical os pointed posteriorly. The mass mentioned was freely mobile and attached to the cervix. The cervix was firm, not soft or patulous. After palpation the cervix began bleeding profusely.

The temperature was 99°F, the pulse 85, the respirations 20.

The urine examination showed a trace of albumin and innumerable red blood cells. The blood showed a red-cell count of 3,310,000 with 72 per cent hemoglobin, and a white-cell count of 14,600. A blood Hinton test was negative.

On the day after admission the patient lost 1500 cc. of blood by vagina. The blood pressure neared shock levels before transfusion brought relief. On the second hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. JOE V. MEIGS. This case is a great puzzle to me. There are so many possible diagnoses that it is very difficult to limit it to any one. When a woman bleeds at the age of forty-seven for six weeks and has a brownish discharge one wants to know whether it is really blood or just a discharge. I take it in this case that it was blood. She had had a miscarriage four years before, when forty-three years old. Following this her periods increased so that they lasted from five to seven days, and the bleeding became profuse. As a woman reaches the menopause, her periods frequently increase in duration and amount, however, sometimes the reverse is true.

"Six weeks before entry she missed her regular period and noticed instead the beginning of a brown vaginal discharge." I do not know exactly what that means—whether she went six weeks and then a discharge started up or whether she missed the period and started to bleed. If she skipped a period it might mean one thing, if she bled abnormally at the regular time it might mean something else. The facts that she had labor pains and was nauseated, that she had changes in the breasts and that the uterus was in the midline, symmetrical and consistent with pregnancy make one think, coupled with her history, that she had an abnormal pregnancy of some sort. On the other hand, patients approaching the menopause do have changes in their breasts, and we have noticed in the Endocrine Clinic here and at the Huntington Memorial Hospital that many patients at this time commence to have discomfort and pain in the breasts. The facts that the cervix was firm and hard and not patulous and that she was bleeding make one wonder if she was miscarrying the abnormal pregnancy. However, I think that this particular observation may not have been correct. The cervix may have been softer than normal and still have felt fairly firm. The question as to why the cervix should have bled after palpation I cannot answer. One thinks of carcinoma of the cervix, but the history would have been more obvious.

dysmenorrhea, especially the type occurring following childbirth, with a uterus that cannot be held up by pessary. Suspension should nearly always be done following operations on the tubes and ovaries, especially in pelvic inflammations or endometriosis. This operation should not be a fixation of any structure but should be a suspension that leaves the uterus freely movable. In most cases of retroversion the Baldy-Webster or the Coffey operation is best. There must be a good reason for a uterine suspension, and with more understanding the reasons are becoming fewer.

#### MISCELLANEOUS

Pain in the pelvis due to recurrent cancer, provided it is not due to lesions of the kidney, is well controlled for weeks to months by the injection of absolute alcohol intraspinaly. This can be done in two ways: with the patient on her side and hips raised and the injection made first for one side of the cord and later for the other, or with the patient lying on a table with the buttocks up and the head and feet down. By this method both sides of the cord are anesthetized at the same time. If the pain is not relieved by injection, cordotomy, either unilateral or bilateral, may be done. Cordotomy gives permanent relief but removes the sense of temperature as well as pain. As in alcohol injection, pain due to kidney disease is not relieved.

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and after radiation. There can be no doubt that many patients have died of uremia who might have been saved by prompt and intelligent urological treatment. Pain due to renal difficulty may be of any type and in any part of the lower abdomen or thighs. Recognition and treatment of blocked ureters and hydronephroses by dilatation of the ureter or nephrostomy will relieve pain almost instantaneously.

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if she had had cancer, and the cervix would have been friable rather than as it is described here. The uterus, moreover, is much larger and has apparently grown faster than can be accounted for by a diagnosis of cervical cancer.

On the day after admission the patient lost 1500 cc of blood which must mean that she had a very severe hemorrhage. I recall no patient with bleeding from fibroids of any type that lost that much blood in such a short time. A submucous fibroid possibly could bleed that hard, but it seems improbable. Sarcoma would account for a rapidly enlarging uterus, but again I doubt if it would produce so severe a hemorrhage as this was.

I believe that she had an abnormal pregnancy, probably a hydatid mole, possibly a chorionepithelioma, or that she had a submucous fibroid with carcinoma of the cervix. I think the first is the correct diagnosis.

#### CLINICAL DISCUSSION

DR. ROBERT LINTON: Dr Meigs has done a splendid job, as hydatid mole was the correct diagnosis. We had the additional advantage of observing some of the grape-like material that came out of the cervix just before operation.

DR. MEIGS: I should like to know whether an Aschheim-Zondek test was done.

DR. TRACY B. MALLORY: The Aschheim-Zondek report came back the day after operation. It was reported as positive. Their hand, of course, was forced and they could not delay operation.

DR. MEIGS: I have never seen anyone bleed so severely as this from a fibroid, this made me believe that it must have been an abnormal pregnancy. The fact that she had apparently skipped a period and the size of the uterus made me wonder about mole. The uterus was the size of a six months' pregnancy in a very short time.

DR. LANGDON PARSONS: She had a pregnancy at forty-three. Is it not true that chorionepithelioma at this age is not uncommon?

DR. MEIGS: Yes, furthermore, we have heard of cases developing as long as eight years after pregnancy.

DR. LINTON: I think the question of treatment is interesting. There was a good deal of discussion at the time. I was afraid to curet her because she had lost so much blood following pelvic examinations and I thought I would not be able to control the bleeding. Therefore I elected to do a total hysterectomy.

DR. MEIGS: It was a mole and not an epithelioma?

DR. LINTON: Yes.

DR. MALLORY: Dr Thomas R. Goethals

opinion was asked and he advised hysterectomy rather than an attempt to empty the uterus.

I remember one case we had at postmortem in which there was said to have been a fatal hemorrhage from fibroids. However, we did not have an adequate history, so we did not know how long she had bled or how profuse the single hemorrhage had been.

DR. MEIGS: Such patients are apt to bleed a large amount over a long period of time but not suddenly.

#### CLINICAL DIAGNOSIS

Hydatid mole

#### DR. MEIGS'S DIAGNOSIS

Hydatid mole (? chorionepithelioma)

Submucous fibroid, with carcinoma of the cervix?

#### ANATOMICAL DIAGNOSIS

Hydatid mole

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: The mole we found in the uterus consisted of grape-like cysts and grossly was quite benign looking. Histologically there was, as is often the case, a considerable degree of activity that makes one wonder a little whether it might not have been malignant. In any case of this sort the patient should be kept under observation and repeated Aschheim-Zondek tests should be done at frequent intervals. There are very few pathologists with sufficient experience in this field to warrant complete confidence in their ability to rule out cancer in such a case.

DR. MEIGS: Were there any lutein cysts in the ovary?

DR. MALLORY: None were noted.

#### CASE 25062

#### PRESENTATION OF CASE

A forty-three-year-old, married American automobile salesman was admitted complaining of right-sided abdominal pain.

Fifteen months before entry the patient had experienced a sudden, sharp knife-like pain in his abdomen immediately to the right of the umbilicus, which radiated toward the right side. The pain lasted for an hour and was sufficiently intense to cause him to lie down. During the next ten months somewhat similar attacks had occurred, gradually increasing in severity and frequency until at the end of this period he was having three to four such attacks each month. Most of them began in the right lower quadrant as a persistent

soreness, occurred usually in the evening and disappeared the following morning with the aid of ice-packs. After the first attack the pain was of a constant boring nature. It did not radiate and was not accompanied by gastrointestinal upsets, with the exception of slight nausea. He vomited on only one occasion. At the end of the tenth month he had had attacks on two successive days, was thought to have had appendicitis and had come to the Emergency Ward of this hospital. Physical examination showed only slight tenderness over the right abdomen. There were no positive laboratory findings. He was discharged home and told to return if the symptoms recurred. Following this he had had frequent attacks of cramp-like right lower abdominal pain but continued to work, although it was occasionally necessary for him to return home to rest and apply an icebag. The pain varied in its time of appearance but most commonly occurred three to four hours after a meal. Food and antacids occasionally gave partial relief. Vomiting resulted in the improvement of symptoms, but the only reliable treatment was rest and icepacks. Motion increased the pain. Five weeks before entry he vomited one of his meals as essentially unchanged food. During these five weeks he vomited on fifteen or twenty occasions. The vomitus did not contain blood or coffee-grounds material. During the previous few weeks the pain became constant. Four weeks prior to admission he again entered the Emergency Ward, stating that he had been in bed for the past thirty-six hours with right-lower-quadrant pain and had vomited twice. He had lost 8 pounds in weight since his discharge. Physical examination was negative. The blood showed a white-cell count of 16,800. After careful questioning he stated that his pain started in the right costovertebral angle and radiated around to the right lower quadrant. An intravenous pyelogram, Graham test and barium enema were negative. The following day he was much improved and was again discharged. Following this he stated that he had felt a small lump 3 or 4 cm in diameter in his abdomen immediately to the right of the umbilicus. Eleven days before admission the patient again came to the Emergency Ward stating that he had been having intermittent pain beginning in the right costovertebral angle and radiating toward the pubis. Physical examination was again entirely negative. A gastrointestinal x-ray series was done, which showed a 4 cm ulcer crater, 2 cm deep, on the lesser curvature of the stomach, just above the antrum. Belladonna and dietary therapy prevented vomiting during the few days before admission to the wards, but the pain continued. During his entire illness,

though slightly constipated, he had not noticed black, clay-colored or tarry stools. He was an inveterate smoker and drank a considerable amount of coffee and tea. He also had had many financial worries. His past and family histories were otherwise noncontributory.

Physical examination revealed a thin, undernourished male. Small, firm, movable, cervical and axillary nodes were palpated. The chest examination was negative. The blood pressure was 132 systolic, 90 diastolic. There was tenderness in the epigastrium, and spasm, which was apparently voluntary. No masses could be palpated. There was no costovertebral tenderness. Rectal examination revealed tenderness and dullness high on the right. The extremities were negative.

The temperature was 99.8°F., the pulse 90 and the respirations 15.

The urine examination was negative. The blood showed a red-cell count of 3,950,000, with 87 per cent hemoglobin, and a white-cell count of 8100 with 77 per cent polymorphonuclears. The non-protein nitrogen of the serum was 27 mg per cent, the carbon-dioxide combining power 57.6 vol, and the protein 6.8 gm. The chlorides were equivalent to 96 cc of N/10 sodium chloride. A blood Wassermann test was negative. A gastric analysis showed 24 units of free acid and 38 units of total acid, following histamine, 62 units of free acid and 70 units of total acid, and one hour following the injection, 106 units of free acid and 110 units of total acid. The gastric juice was water-clear, except for a small amount of bile-tinged, mucoid sediment. Four stool examinations were guaiac positive.

On the sixth hospital day a gastroscopic examination was done. A large ulcer approximately 3 cm in diameter and 1 cm in depth was seen on the lesser curvature. The margins were nodular, and the base was covered with barium and blood clot. The surrounding mucosa was nodular.

On the twelfth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. RICHARD H. WALLACE. The history of pain in this case is certainly inconsistent and bizarre. At one time or another the pain suggests a lesion in a good many different places in the abdomen. For instance, fifteen months before entry he had sudden, sharp, knife-like pains which radiated to his right side and were debilitating. These attacks of pain which increased in severity and frequency and were followed by persistent soreness, constant and boring in nature, in the right upper

quadrant, somewhat suggest gallstone colic. At least one attack, however, was thought to be acute appendicitis, because he was brought into the Emergency Ward with that diagnosis. Later he had cramp-like right lower abdominal pain, and then shortly after that, although there is no mention of epigastric pain, the pain came on three or four hours after meals and sometimes was relieved by food and antacids—which suggests gastric or duodenal ulcer. Then it is noted that motion increased the pain. That is a little suggestive of peritoneal irritation, perhaps inflammatory. Next, the pain instead of being intermittent became constant. It started at the right costovertebral angle and radiated around to the right lower quadrant. One might think of some renal lesion. Then the patient thought he noticed a lump 3 or 4 cm in diameter, but this was not confirmed on physical examination despite the fact that he was a thin undernourished man upon whom it was apparently possible to do a satisfactory abdominal examination. The pain again became intermittent and is described as beginning at the right costovertebral angle and radiating to the pubis, suggesting ureteral colic. All this is quite difficult for me to put together. We have two tangible leads—the x-ray study and the gastroscopic examination. I think we might see what the films show.

DR. RICHARD SCHATZKI: A case like this means a lot of worry for the roentgenologist. You can see a large crater, but it is wider and not so deep as that in a case\* we discussed recently. In other words it is not so penetrating in character as the other crater. Furthermore, the surrounding induration is quite extensive, involving an area measuring 10 cm, so that the crater represents only a part of the diseased area. Unless one can demonstrate a definite tumor mass in such a case, I think it is fairly impossible to say from the x-ray whether the lesion is benign or malignant.

DR. WALLACE: At least we have a definite lesion in the stomach. In regard to all the other suggestions,—gall-bladder disease, appendicitis and renal or ureteral stones,—there is very little else in the history or the findings to substantiate any of them. The pyelogram and the Graham tests were negative. The urine is reported as negative. I believe that we can rule out gross disease of that sort.

We come back to the old question, Is the lesion benign or malignant? From the history the type of pain is certainly not that of a gastric neoplasm. There is no mention of epigastric pain. There is a suggestion that the pain came on at a very definite period after meals and that it was re-

lieved by food and soda. The laboratory data add no helpful information until we get to the gastric analysis. That is certainly consistent with ulcer. We are reminded of the statement in the history that "he had had many financial worries," so there is considerable to make us believe that this may have been a benign ulcer.

On the other side of the fence the gastroscopic examination not only revealed the presence of the ulcer, as described by x-ray, but also showed that the ulcer margins and the surrounding mucosa were nodular. That definitely rules out benign ulcer, and so we must assume that we are dealing with a neoplasm of the stomach of some sort. Could this have been a leiomyosarcoma? I judged from reading the x-ray report that there was very little bulk to this tumor, but Dr. Schatzki suggested that there may have been 10 cm of induration.

DR. SCHATZKI: But not a real mass.

DR. WALLACE: That, I believe, is against leiomyosarcoma. It is usually a bulky tumor and less likely to have ulceration of this sort. In the ones I have seen, the outstanding sign has been hemorrhage. We have very little to suggest that in the history, although there were four guaiac-positive stools. The vomitus had not been grossly bloody at any time, and I am inclined to rule out leiomyosarcoma. Some very rare type of sarcoma might explain the picture, but I do not know how one could make such a diagnosis. Certainly it is hard to rule out a carcinoma with central ulceration, though the one thing that makes me hesitate is the high acidity of the gastric contents. One usually expects anacidity in extensive cancer of the stomach. Certainly in a good many cases of cancer of the stomach there is a fairly normal acidity, but I believe it would be very unusual to have as high an acidity as this is.

I am interested in the small, fairly movable, cervical and axillary nodes mentioned in the physical examination. I do not imagine that they were biopsied or there probably would be some note of it. Although Dr. Mallory has, at times, made the statement that in cases of gastrointestinal lymphoma the lymph nodes are likely to show no metastases, I still believe that lymphoma of the stomach might produce this picture. It is more likely to be associated with high acidity than is cancer, and might account for the fullness by rectum, although, of course, that might have been metastatic carcinoma. On the law of averages this ought to be a cancer of the stomach, but I am inclined to make my first choice lymphoma, with carcinoma of the stomach a close second.

DR. EDWARD B. BENEDICT: I did the gastroscopy on this patient, and from the size of the ulcer, the

irregular margins and the nodular appearance of the surrounding tissue, concluded my report by saying it was very suspicious of cancer. I have been fooled by a nodular appearance's being due to very marked hypertrophic gastritis, and therefore I was not sure about cancer. In making this differential diagnosis, Dr. Schindler, the inventor of the flexible gastroscope, believes that the presence of the circulating blood is very helpful in showing up the irregular outline of carcinoma, as distinguished from the smooth margin of benign ulcer, and that the gastroscopist studying the living tissue therefore has an advantage over the pathologist examining the gross specimen after removal. Only long experience will settle this point.

#### PREOPERATIVE DIAGNOSES

Benign gastric ulcer  
Carcinoma of stomach?

#### DR. WALLACE'S DIAGNOSIS

Lymphoma of stomach  
Carcinoma of stomach?

#### ANATOMICAL DIAGNOSIS

Carcinoma of stomach, with secondary peptic ulceration

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: This stomach was resected with a clinical diagnosis of benign ulcer. When the specimen reached the laboratory we found a very extensive but rather shallow ulceration (Fig. 1). The borders were considerably undermined. The whole base of the ulcer showed the typical fibrinoid membrane of a peptic ulcer that is in the stage of acute progression, but on microscopical examination it was seen that there were atypical glands invading the submucosa. Each of several sections showed recognizable foci of

carcinoma at the margins of the ulcer. In other words cancer completely surrounded the area of ulceration so that the probabilities are again in favor, to my way of thinking, of an extensive car-



Figure 1 *Ulcerated Lesion at Lesser Curvature*

cinoma which had been almost completely eroded by a peptic ulcer.

DR. ALLEN G. BRAILEY: Was the nodular appearance due to cancer?

DR. MALLORY: It may have been, though we could not verify it. As Dr. Benedict says it may have been more obvious in life than it was after resection. We could not call this cancer from the gross examination in the laboratory, even by palpation, and I think you will agree that in the picture it looks perfectly benign.

DR. GRANTLEY W. TAYLOR: Did you find that stretch of 10 cm. of induration?

DR. MALLORY: There was a fairly extensive gastritis on both sides of the tumor, but we did not find any extensive tumor infiltration, in fact it was barely enough to establish the diagnosis.

quadrant, somewhat suggest gallstone colic. At least one attack, however, was thought to be acute appendicitis, because he was brought into the Emergency Ward with that diagnosis. Later he had cramp-like right lower abdominal pain, and then shortly after that, although there is no mention of epigastric pain, the pain came on three or four hours after meals and sometimes was relieved by food and antacids—which suggests gastric or duodenal ulcer. Then it is noted that motion increased the pain. That is a little suggestive of peritoneal irritation, perhaps inflammatory. Next, the pain instead of being intermittent became constant. It started at the right costovertebral angle and radiated around to the right lower quadrant. One might think of some renal lesion. Then the patient thought he noticed a lump 3 or 4 cm in diameter, but this was not confirmed on physical examination despite the fact that he was a thin undernourished man upon whom it was apparently possible to do a satisfactory abdominal examination. The pain again became intermittent and is described as beginning at the right costovertebral angle and radiating to the pubis, suggesting ureteral colic. All this is quite difficult for me to put together. We have two tangible leads—the x-ray study and the gastroscopic examination. I think we might see what the films show.

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irregular margins and the nodular appearance of the surrounding tissue, concluded my report by saying it was very suspicious of cancer. I have been fooled by a nodular appearance's being due to very marked hypertrophic gastritis, and therefore I was not sure about cancer. In making this differential diagnosis, Dr Schindler, the inventor of the flexible gastroscope, believes that the presence of the circulating blood is very helpful in showing up the irregular outline of carcinoma, as distinguished from the smooth margin of benign ulcer, and that the gastroscopist studying the living tissue therefore has an advantage over the pathologist examining the gross specimen after removal. Only long experience will settle this point.

#### PREOPERATIVE DIAGNOSES

Benign gastric ulcer  
Carcinoma of stomach?

#### DR. WALLACE'S DIAGNOSIS

Lymphoma of stomach  
Carcinoma of stomach?

#### ANATOMICAL DIAGNOSIS

Carcinoma of stomach, with secondary peptic ulceration

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: This stomach was resected with a clinical diagnosis of benign ulcer. When the specimen reached the laboratory we found a very extensive but rather shallow ulceration (Fig 1). The borders were considerably undermined. The whole base of the ulcer showed the typical fibrinoid membrane of a peptic ulcer that is in the stage of acute progression, but on microscopical examination it was seen that there were atypical glands invading the submucosa. Each of several sections showed recognizable foci of

carcinoma at the margins of the ulcer. In other words cancer completely surrounded the area of ulceration so that the probabilities are again in favor, to my way of thinking, of an extensive car-

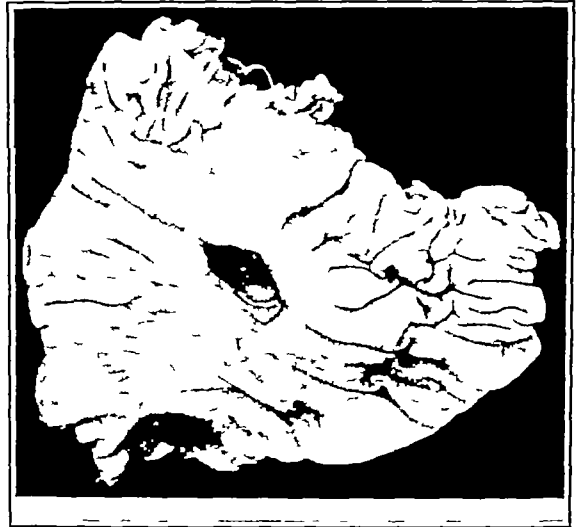


Figure 1 *Ulcerated Lesion at Lesser Curvature*

cinoma which had been almost completely eroded by a peptic ulcer.

DR. ALLEN G. BRAILEY: Was the nodular appearance due to cancer?

DR. MALLORY: It may have been, though we could not verify it. As Dr Benedict says it may have been more obvious in life than it was after resection. We could not call this cancer from the gross examination in the laboratory, even by palpation, and I think you will agree that in the picture it looks perfectly benign.

DR. GRANTLEY W. TAYLOR: Did you find that stretch of 10 cm of induration?

DR. MALLORY: There was a fairly extensive gastritis on both sides of the tumor, but we did not find any extensive tumor infiltration, in fact it was barely enough to establish the diagnosis.

quadrant, somewhat suggest gallstone colic. At least one attack, however, was thought to be acute appendicitis, because he was brought into the Emergency Ward with that diagnosis. Later he had cramp-like right lower abdominal pain, and then shortly after that, although there is no mention of epigastric pain, the pain came on three or four hours after meals and sometimes was relieved by food and antacids—which suggests gastric or duodenal ulcer. Then it is noted that motion increased the pain. That is a little suggestive of peritoneal irritation, perhaps inflammatory. Next, the pain instead of being intermittent became constant. It started at the right costovertebral angle and radiated around to the right lower quadrant. One might think of some renal lesion. Then the patient thought he noticed a lump 3 or 4 cm. in diameter, but this was not confirmed on physical examination despite the fact that he was a thin undernourished man upon whom it was apparently possible to do a satisfactory abdominal examination. The pain again became intermittent and is described as beginning at the right costovertebral angle and radiating to the pubis, suggesting ureteral colic. All this is quite difficult for me to put together. We have two tangible leads—the x-ray study and the gastroscopic examination. I think we might see what the films show.

DR. RICHARD SCHATZKI. A case like this means a lot of worry for the roentgenologist. You can see a large crater, but it is wider and not so deep as that in a case\* we discussed recently. In other words it is not so penetrating in character as the other crater. Furthermore, the surrounding induration is quite extensive, involving an area measuring 10 cm., so that the crater represents only a part of the diseased area. Unless one can demonstrate a definite tumor mass in such a case, I think it is fairly impossible to say from the x-ray whether the lesion is benign or malignant.

DR. WALLACE. At least we have a definite lesion in the stomach. In regard to all the other suggestions,—gall-bladder disease, appendicitis and renal or ureteral stones,—there is very little else in the history or the findings to substantiate any of them. The pyelogram and the Graham tests were negative. The urine is reported as negative. I believe that we can rule out gross disease of that sort.

We come back to the old question, Is the lesion benign or malignant? From the history the type of pain is certainly not that of a gastric neoplasm. There is no mention of epigastric pain. There is a suggestion that the pain came on at a very definite period after meals and that it was re-

lieved by food and soda. The laboratory data add no helpful information until we get to the gastric analysis. That is certainly consistent with ulcer. We are reminded of the statement in the history that "he had had many financial worries," so there is considerable to make us believe that this may have been a benign ulcer.

On the other side of the fence the gastroscopic examination not only revealed the presence of the ulcer, as described by x-ray, but also showed that the ulcer margins and the surrounding mucosa were nodular. That definitely rules out benign ulcer, and so we must assume that we are dealing with a neoplasm of the stomach of some sort. Could this have been a leiomyosarcoma? I judged from reading the x-ray report that there was very little bulk to this tumor, but Dr. Schatzki suggested that there may have been 10 cm. of induration.

DR. SCHATZKI. But not a real mass.

DR. WALLACE. That, I believe, is against leiomyosarcoma. It is usually a bulky tumor and less likely to have ulceration of this sort. In the ones I have seen, the outstanding sign has been hemorrhage. We have very little to suggest that in the history, although there were four guaiac-positive stools. The vomitus had not been grossly bloody at any time, and I am inclined to rule out leiomyosarcoma. Some very rare type of sarcoma might explain the picture, but I do not know how one could make such a diagnosis. Certainly it is hard to rule out a carcinoma with central ulceration, though the one thing that makes me hesitate is the high acidity of the gastric contents. One usually expects an acidity in extensive cancer of the stomach. Certainly in a good many cases of cancer of the stomach there is a fairly normal acidity, but I believe it would be very unusual to have as high an acidity as this is.

I am interested in the small, fairly movable, cervical and axillary nodes mentioned in the physical examination. I do not imagine that they were biopsied or there probably would be some note of it. Although Dr. Mallory has, at times, made the statement that in cases of gastrointestinal lymphoma the lymph nodes are likely to show no metastases, I still believe that lymphoma of the stomach might produce this picture. It is more likely to be associated with high acidity than is cancer, and might account for the fullness by rectum, although, of course, that might have been metastatic carcinoma. On the law of averages this ought to be a cancer of the stomach, but I am inclined to make my first choice lymphoma, with carcinoma of the stomach a close second.

DR. EDWARD B. BENEDICT. I did the gastroscopy on this patient, and from the size of the ulcer, the



clinics with the special knowledge that they alone possess. They accept the responsibility of caring for patients after discharge from the clinics and thus relieve the latter of a service they are not equipped to carry. The mutual dependence of these two groups of physicians is evident.

Attempts to organize medical services must recognize those aspects of medicine best designated as its art and its personal relations, as well as its sciences, technics and equipment. The inclusion of all these into the scheme of things is what makes the problem of organization difficult. There seems to be no reason why organization necessitates regimentation, if it be accomplished willingly by those who render the service. There seems no reason to believe that proper organization of medical services should affect deleteriously the position of the family physician. Granted for the sake of argument that specialization is here to stay, the family physician need not be relegated to the bargain basement, but rather elevated to a high position among specialists.

One may well ask whether efficient medical care requires less specialization with more individualistic professional service or more specialization with better co-ordination between the services rendered by specialists, among whom the family physician is the most important.

## CANCER AND CIVILIZATION

ONE of the most frequent misconceptions with regard to the origin of cancer is the belief that it is related to civilization. For years the statement has been current that savage races are practically free from cancer. The reasons for this misconception are obvious. The sick savage rarely comes under formal medical attention, and if he does, the facilities for investigation are such that unless the disease is far advanced or superficial, the chance of diagnosis is relatively slight.

Undoubtedly there are marked variations in the incidence of different types of cancer, but in general the cancer rate tends to maintain a fair degree of constancy in different localities where diagnosis is accurate and medical attention readily

available. In most regions where interest in cancer has been developed, the death rate tends to lie between 110 and 140 per 100,000. We know now that the Chinese have their full share of cancer, with primary cancer of the liver one of the very prominent forms. We know that the natives of India are frequent victims of cancer of the mouth and upper respiratory passages. We know that skin cancer is not infrequent among many of the primitive peoples, particularly in swampy regions where leg ulcers are prevalent and neglected.

One of the most careful recent studies of the incidence of cancer among primitive peoples is that of Bonne and his associates\*. Among most primitive people there is no worth-while evidence as to the incidence of any disease. This is in large part due to the failure of the savage to recognize internal disorders as disease, tending rather to regard them as the effects of the presence of an evil spirit.

If we take the hospital records in Batavia, Singapore or Manila, the liver is the outstanding site of cancer. Virtually none of these cases would be recognized had the patients not died in large hospitals where autopsies are performed. Bonne and his co-workers estimate the incidence of cirrhosis of the liver in the Dutch East Indies as 6.9 per cent for male Malays, this is undoubtedly a factor in the frequency of carcinoma of the liver. In Batavia, among the Malays cancer of the stomach does not appear among the ten commonest forms of cancer although among the Chinese and Japanese its incidence is nearly as high as that in the Western hemisphere. The Malays, however, do show a high incidence of skin cancer and of malignant tumors of the cervical lymph nodes.

When the native population in the Far East is carefully studied, it becomes apparent that, once adjustments are made for age and the high incidence of such infectious diseases as cholera and plague, the incidence of cancer differs but little from that in European or American communities. On the other hand there is material variation in the primary sites of the disease.

\* Bonne, C., Hertz, P. H., Klerks, J. V., Posthuma, J. H., Radama, W. and Tyokrongoro, S. The morphology of the stomach and gastric secretion in Malays and Chinese and the different incidence of gastric ulcer and cancer in these races. *Am. J. Cancer* 33: 65-70, 1936.

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## ORGANIZATION OF MEDICAL SERVICES

THE rapid increase in medical knowledge and facilities not only has raised the problem of distribution of costs of medical care but also has created a problem of organizing medical services in the interest of efficiency and economy. In establishing the boards of certification in the various specialties of medicine and surgery the profession has taken cognizance of its being divided into many branches and of the necessity of having qualified specialists. We do not intend to discuss here the pros and cons of specialization. Accepting specialization as it exists today, questions arise which deserve consideration.

One may ask if the profession has taken adequate cognizance of the specialty of "family physician." The question raised differs from one concerned with the importance of the family physi-

cian. The point to be made is whether or not the family physician is trained today purposely to care for the plus or minus eighty per cent of illness for which he is a specialist and gives proper and economical care. And after acquiring his training, is the family physician properly coordinated in the general scheme of modern medicine with other specialties so that there is a reasonably efficient supplementation and a reasonable absence of overlapping? On the one hand, we have the so-called specialists trained in the application of physiological, chemical, pathological or other special knowledge or technics to the diagnosis or treatment of disease. On the other hand, we have the family practitioner who cares for the vast majority of illness that does not demand such technical knowledge but nonetheless calls for a very specialized type of ability. It is as inefficient to have the so-called specialist of today trained to deal with all phases of minor illness, which he never sees, as to have the family practitioner trained to use technical knowledge and facilities for which he will but occasionally encounter the need.

A sound approach to an economical and efficient organization of medical service is based perhaps on a recognition of the truth of two statements in which a paradox seems to appear but actually does not occur. First, medical knowledge and art have grown beyond the capacity of the individual physician. Secondly, eighty per cent of society's ills can be properly cared for by the family physician.

Under a properly organized medical service there is no antagonism between the specialists of the large clinics and the family practitioners. The services of the one supplement those of the other in a field so vast that neither alone is adequate. The former make available to the practitioner diagnostic special treatment clinics. They introduce new methods of medical and surgical therapy. They give teaching clinics, publish papers and speak before medical societies, and thus, free of charge, give to the practitioner the new medical knowledge that from year to year becomes his stock in trade. On the other hand, the practitioners refer patients to the clinics. Many of them give much of their time and experience to the clinics, thus providing the

lacerated The fundus was examined manually and found not to contain any placental tissue The uterus was packed in consequence, and the patient was transfused Years ago hot intrauterine douches were frequently employed in cases of this type, they are rarely resorted to now

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning February 13

##### BRISTOL NORTH

Thursday, February 16, at 4 00 p m., at the Morton Hospital, Taunton. Subject—Bright's Disease and Hypertension Evaluation of new therapy Diagnosis. Instructor W Richard Ohler Lester E. Butler, *Chairman*

##### BRISTOL SOUTH (Fall River Section)

Tuesday, February 14, at 4 00 p m., at the Union Hospital, Fall River Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor Francis M. Thurmon. Howard P Sawyer, *Chairman*

##### MIDDLESEX EAST

Tuesday, February 14, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications Instructor R. Cannon Eley Walter H. Flanders, *Chairman*

##### MIDDLESEX NORTH

Thursday, February 16, at 4.30 p m., at St. John's Hospital, Lowell Subject—Gonorrhea Modern treatment of gonorrhea. Instructor Weston T Buddington. William S Lawler, *Chairman*

#### REGULATION OF THE PRACTICE OF MEDICINE IN MASSACHUSETTS\*

There are in Massachusetts, as in every other state, several kinds of regulation of the practice of medicine, but the only kind that I shall talk about today is control by law This regulation may be described in a general way by saying that the State declares that certain persons shall be licensed to practice medicine and it prohibits the practice by any unlicensed person.

This does not mean that the State sets forth in detail how a doctor shall treat his patients If he is licensed he may use drugs or he may operate, he may treat the mind or treat the body by means of massage or exercise, he may employ any resource of any of the cults, according to his own judgment and conscience. But his practice may be stopped if he becomes insane or a felon or a drug addict, or if he is guilty of deceit or of gross professional misconduct,—whatever that may be,—or if he violates any law of the Commonwealth with ref-

erence to the practice of medicine. It is of supreme importance that only the right kind of person be admitted to practice. I shall point out to you later that in spite of its importance, the kind of person is one of the things to which the statute pays little attention.

Ordinarily if one is planning a course of action, such as, for example, the regulation of the practice of medicine, one attempts to make clear just what it is that one is trying to regulate. The physician wants to know in a general way what he may do, the patient wants to know what may be done to him, and the court may want the guidance of a law when it has to decide whether a given act is or is not illegal

Massachusetts has never attempted to define the practice of medicine, although in nearly every other state of the Union there is some definition, generally regarded as very satisfactory for the purposes of administration. Two objections have been raised here, first, it cannot be done—if you try you will put in something you do not want, and you will leave out something that ought to go in, secondly, it is not necessary—we have always gotten along without it. These objections may be real or imaginary

It would be interesting to review historically, if there were time, the changes which have taken place in what is meant by the practice of medicine, especially since there is still confusion in the minds of many persons. The word medicine has today at least three meanings, which give no trouble in ordinary conversation but which have caused much discussion when the enforcement of the law is under consideration.

When we say medicine we may mean a drug as distinguished from a food, or we may mean a branch of the healing art which is distinguished from surgery, or we may mean the whole healing art itself as distinguished from law or theology or engineering There are always those who say they are not practicing medicine because they do not use drugs or because they do not operate. Yet they are practicing medicine because they are treating people who are sick for the purpose of giving relief (perhaps even of making them well), and it would be helpful in law enforcement if the statute said just this

Why should the State forbid the practice of medicine by any person who is not licensed? Many persons have asked this question, and there are at least three groups in the community who as a matter of principle deny the right of the State to interfere with the practice of medicine. But it is not worthwhile to discuss these views now, however important they may seem to the holders thereof, as the courts have on numerous occasions upheld the power of the State to determine the conditions under which medicine may be practiced. At one time there was no statutory regulation in Massachusetts. Then came a period of regulation, closed in 1859 by the abolishment of all state control, for reasons which we cannot go into now. It is interesting to note that Massachusetts was the last to take this backward step For thirty five years only the criminal law was effective. Then in 1894 Massachusetts again decided that some regulation was necessary and created a Board of Registration in Medicine. It was next to the last state to do so Of the striking slowness of Massachusetts to enact legislation to protect its citizens against unqualified practitioners of medicine, I shall speak again later

The reason why such protection is necessary is that most people have no way of telling by their own judgment who is a competent physician, nor can they tell very well even by experience. It is a field outside of anything of which they have adequate knowledge. Through im-

\* Green Lights to Health broadcast given by Dr. Stephen Rushmore on Wednesday December 28 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## POSTPARTUM HEMORRHAGE

Mrs. M. B., a twenty-one-year-old primipara at term was admitted to the hospital in labor on November 10, 1938.

Her family history contained nothing of unusual note. The patient had had measles and scarlet fever. Catamenia began at twelve, were regular, with a twenty-eight-day cycle, and lasted four days. Her last period was February 1, making her expected date of confinement November 8. The pregnancy had been uneventful.

Physical examination on entry showed a well-developed and nourished young woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The fundus was 30 cm. above the symphysis. The vertex presented in the ODP position and was lightly engaged. The fetal heart was distinctly heard in the right lower quadrant. On rectal examination, the cervix was found to be soft and partly taken up. The os admitted one finger, and through this the presenting part could be felt in high mid-position. The sacral promontory did not protrude abnormally, the vaults were free, and the pelvic outlet was ample. The membranes were intact. There was no edema of the extremities. The temperature, pulse, respirations, blood pressure and urine were all normal.

The patient had an inactive labor, her pains coming at irregular intervals and being of varying intensity. Nembutal, in moderate dosage, was used for the control of pain. At the end of about thirty hours she was fully dilated, with the occiput rotated to a right transverse position. The contractions at this time were good, but still irregular. Gas and oxygen was given with the pains for about an hour, with the patient bearing down during contractions, but little was accomplished either in rotation or descent of the head. Because of this lack in progress forceps delivery was decided on. Under nitrous oxide, oxygen and ether anesthesia a forceps was applied to a partially rotated ODP, after a right oblique episiotomy, and delivery of an 8-pound, 10-ounce baby

was effected without undue traction. The episiotomy was sutured in routine fashion.

Fifteen minutes after the birth of the baby, the placenta separated and was expressed from the lower uterine segment by moderate pressure on the fundus. An ampule of Ergotrate was injected into the thigh muscles at this time. The placenta and membranes were found to be complete. The fundus did not contract well, and a large quantity of blood was expelled from the vagina. Pituitary extract and more ergot were given intramuscularly, ice was applied to the fundus and it was held lightly. As more than normal bleeding continued though the fundus seemed firmer, the cervix was examined digitally. No deep tear was felt on either side. The foot of the bed was tipped up, ice was continued on the fundus, and glucose in saline was started intravenously. At this time the patient was pale, with a pulse of 120, her blood pressure, despite the blood loss, was 120 systolic. Typing for transfusion was begun. The uterine muscle remained flabby, and while no large hemorrhage occurred, there was a steady staining of the vaginal pads which was considerably more than normal in amount. One-quarter grain of morphine was given subcutaneously.

Three hours after delivery, with the hemorrhage continuing, the pulse 130 and the blood pressure 100 systolic, the uterine cavity was explored manually under nitrous oxide and oxygen anesthesia. No remnant of placenta could be felt, and with a speculum in the vagina, no marked cervical tear was found. The uterus and vagina were firmly packed with gauze and an ampule of Ergotrate was injected intravenously. The patient was then transfused with 500 cc. of citrated blood. Her condition improved rapidly. She did not stain through the packing, the fundus remained firm around the gauze, the pulse came down to 100, the blood pressure went up to 120 systolic, and her color improved. At the end of twenty hours the packing was removed from the vagina and uterus. No hemorrhage followed. Fluids were forced and iron given by mouth thereafter, and the subsequent puerperium was uncomplicated.

*Comment.* This case of uterine atony is typical of those patients who have no profound hemorrhage but continue to bleed without showing normal periods of contraction. No great amount of blood was lost at any time, and yet the blood pressure continued to fall and the pulse became more rapid—not over a period of minutes but during the course of two or three hours.

The usual treatment of cases that continue to bleed as this one did was carried out successfully. The cervix was inspected and found not to be

other states have gone ahead, Massachusetts has stood still. It is true that in 1936 a law was passed giving power of approval of medical schools from which candidates are admitted to examination, which law, if effective, would put Massachusetts approximately on the level of most of the other states, but the effective date of the act, set originally for January 1, 1939, was changed by the legislature this year to January 1, 1941.

Q Why was this postponement authorized?

A. There was very powerful opposition to the bill before it became law, and since then there have been very vigorous efforts to make the law of no effect. If you are really interested in this question, I suggest that you should interest your own senator and your own representative in the General Court. I can assure you that opposition to this law is not offered by those that have the health of the public—that is to say, your health—as their first interest.

## MISCELLANY

### CONNECTICUT NEWS

#### HURRICANE AND FLOOD

On September 21, and for several days following, Connecticut suffered a major disaster with irreparable loss of life and property. A tidal wave wiped out many summer colonies. The maximum water level for the Connecticut River at Hartford was 35.4 feet above mean sea level, only about 2.2 feet below the record 1936 flood level. Public water supply systems and sewage-disposal systems were damaged, many sections were flooded by polluted water, wells were contaminated, and relief workers were exposed to possible outbreaks of intestinal disease. In spite of all this, very little illness resulted. To the state and local health departments and to the Red Cross is due much praise for excellent preventive health work. Sixty-eight deaths resulted from the hurricane, 56 of these from drowning and 12 from collapse of buildings or from falling trees.

#### MIDWIFE INSTITUTE

The Fifteenth Annual Midwife Institute was held at the New Haven Department of Health on November 3. The institute affords the midwives in the State an opportunity to learn new methods for caring for maternity patients and newborn infants. In addition to 22 midwives, several health officials, public health nurses and hospital maternity nurses attended.

#### NEW CHIEF OF DIVISION OF CRIPPLED CHILDREN

Following the resignation of Dr. Russell V. Fuldner as chief of the Division of Crippled Children, Connecticut Department of Health, the appointment has been announced of Dr. Louis Spekter as his successor. Dr. Spekter is a graduate of Trinity College and the University of Rochester School of Medicine. He served an internship at Duke University Hospital and has specialized in pediatrics.

#### REPORT OF STATE HEALTH COMMISSIONER

Dr. Stanley H. Osborn, state health commissioner, in his biennial report to Governor Cross, made the following recommendations: (1) the appointment of a properly trained and qualified person to advise on housing activities and slum-clearance programs, (2) the furnishing of suitable quarters to house the Connecticut Department of Health, (3) the establishing of state grants to towns to aid them in forming co-operative full time health depart-

ments under the Sanitary District Law, (4) the appropriation of a contingent fund that will be available to handle the emergencies affecting the health of the State between sessions of the General Assembly, (5) the instituting of an intensive case finding program to aid in locating early cases of tuberculosis in the small cities and towns, (6) the beginning of a pneumonia program for supplying service for pneumococcus typing and for purchasing anti-pneumococcus serums to be used by those unable to pay for them, (7) the allotment of an appropriation to assist towns to carry out indexing and binding of their old vital-statistics records, started by the State in 1935. The Public Health Council whose report accompanied that of the commissioner recommended (1) an increase in the budget of the Connecticut Department of Health from \$850,000 for two years to about \$1,400,000 and (2) financial state aid to towns lacking adequate tax receipts so that sufficient state and local money may be available to match federal funds for health projects. Connecticut's death rate of 10.1 deaths per 1000 population in 1937 was equal to the lowest in the history of the State and was lower than that of Massachusetts, Rhode Island or New York.

#### PREPAYMENT HOSPITALIZATION UNDER STATE CONTROL

A bill setting up regulations for the operation of non-profit corporations providing hospital-care insurance on a prepayment basis has been approved by the Governor's Committee on Prepayment Hospitalization. This bill will be introduced at the coming session of the General Assembly. The bill, placing supervision of all such plans in the hands of the insurance commissioner, would permit the continuance and expansion of the three plans now operating in the state, the organization of new plans where needed and the merger of any or all of them. The Governor expressed his appreciation of the work of this committee. The report of the committee, which is headed by Dr. Wilmar M. Allen, director of the Hartford Hospital, made twenty specific recommendations.

#### PREPAYMENT HOSPITALIZATION SPREADS TO HARTFORD

The Plan for Hospital Care, Incorporated, a non profit organization designed to cover future hospital bills of every employed man and woman, is now in operation in the Hartford area. Already in successful operation in New Haven and Waterbury and having a state membership of more than 44,000 persons, it has now added to its list of member hospitals the following: Hartford Hospital, St. Francis Hospital (Hartford), Mt. Sinai Hospital (Hartford), Manchester Memorial Hospital, Charlotte Hungerford Hospital (Torrington), and Middlesex Hospital (Middletown). The Plan for Hospital Care was inaugurated in Connecticut in September, 1936, the first subscribers joined in April, 1937, and within eighteen months the plan became the twelfth largest of the forty similar plans throughout the United States.

#### HARTFORD INFANT MORTALITY RATE

Hartford's infant mortality rate for 1937 was 32.25, a much lower rate than that for the United States as a whole. Premature birth and injuries at birth are two factors of importance in maintaining the infant mortality rate as high as it is.

#### WHOOPIING COUGH

Whooping cough ranks first in Hartford as a cause of death among the communicable diseases of childhood. The average number of deaths per year during the last

memorial tradition and custom and through actual knowledge and skill, the physician possesses vast power. In the nature of the relation of physician and patient, this power must often be exercised with no control except the conscience of the physician. For example, at the time of an emergency there can be no outside control. It is on account of this vast power and the danger from its improper use that the public should be protected against unqualified physicians, whether they be ignorant or unskillful, but especially if they be not conscientious and do not safeguard the welfare of the patient.

How is the regulation of the practice of medicine carried on in Massachusetts? Since 1894, as previously stated, there has been a Board of Registration in Medicine, consisting of seven physicians who have been at least ten years in practice, appointed by the governor (one each year), with the approval of the executive council. The choice of the governor is subject to two important restrictions: no member of the Board can be a teacher in a medical school, and not more than three members of the Board can be members of one chartered state medical society. The second restriction was perhaps of some value when there were three state medical societies and when the spirit of partisanship ran high. It is of doubtful value at the present time. The first restriction, preventing teachers of medicine from being appointed to the Board, was presumably to prevent them from using undue influence in assisting the graduates of medical schools in which the men were teaching. This restriction also is of very doubtful value at the present time, and it has a clear disadvantage because it gives preference to examiners who are least likely to know how to give examinations and how to judge the results. This is important because other provisions of the statute make ability to pass the examination the chief test of fitness to practice medicine.

The Board then, acting under special directions of the statute, has two chief duties: to license physicians whom it deems qualified, and to unlicense physicians, once deemed qualified, who by their action have shown cause for disqualification.

The conditions for admission to examination for license are that the candidate must be twenty-one years of age, of good moral character and a high school graduate and, after attending a four year medical course of not less than thirty-two weeks in each year, must have received the degree of doctor of medicine or its equivalent from a school legally chartered and empowered to confer such a degree. Concerning the examination the statute says it shall include certain subjects but makes this significant requirement: 'It shall be sufficiently thorough to test the fitness of the candidate to practice medicine.'

This raises at once the question whether any examination that the Board can give will fulfill this condition. The fundamental tests of fitness are knowledge of the body and the mind of the patient, knowledge of the resources of the science and the art of medicine, skill in their application, sympathetic understanding of humanity, and a character which will enable the physician to carry well the responsibilities of his profession.

A written examination can be devised to test knowledge, a practical examination will test skill. But what examination can the Board devise for finding out the kind of person the candidate really is? The statute shows too much confidence in the adequacy of examinations. This confidence is not justified by the results. In this respect Massachusetts differs again from the statutes of nearly all the other states. If the candidate meets the requirements of the statute and passes the examination, he is given a license to practice.

Taking away the licenses of physicians deserves much more time than can be given to its consideration now. I have already referred to some of the disqualifications because of which a license may be suspended or revoked, and most of these need no further comment because they are clear and definite. But one may well ask the meaning of 'gross misconduct in the practice of his profession,' which is one of the reasons given for taking away a physician's license to practice. Objection has been made by certain persons to the use of such a vague expression, although a similar phrase occurs in the statutes of other states. But the courts have upheld the use of the words 'gross misconduct.' The significance of the phrase lies in the suggestion that there is a relation between physician and patient (different from a business contract) which is fundamental. There is usually no formal contract between the physician and the patient. But when the patient places himself in the care of the physician, he entrusts his well-being to the doctor, and the two persons, without any formal contract, might be said to be like a trustee of a trust fund and the beneficiary of the trust. Any failure on the part of the physician to discharge faithfully the duty of physician as trustee may be regarded as professional misconduct.

Q Does everyone who wishes to practice medicine in Massachusetts have to pass the examination set by the Massachusetts Board of Registration in Medicine?

A The law says he must pass a written examination but it also specifies one examination which the Board may accept in place of its own. This is the examination set by the National Board of Medical Examiners.

Q Is this National Board part of the federal government?

A No, it is a private organization which includes representatives of the medical branches of the federal government as well as representatives of several private medical organizations of national scope.

Q Does the license of the National Board permit practice anywhere and everywhere in the United States?

A No, the National Board has no power at all to license, and the certificate which it gives is called a diploma, certifying only that the candidate has passed the examination.

Q How many states are authorized by their laws to accept the National Board examination?

A There are now over forty states which accept this examination in place of their own.

Q Why do so many states accept this examination if it is given by a private organization?

A The requirements for admission to this examination have been so high and the examination has proved to be so searching and so comprehensive that it has come to be regarded as more difficult than any state board examination.

Q Does any state accept the examination of another state in place of its own?

A Yes many states issue licenses on the basis of what is called reciprocity between the states. But it is interesting to note that no other state has established reciprocity relations with Massachusetts in this respect.

Q Why is that?

A That is because for years the standards for admission to practice medicine in Massachusetts have been so low that no other state would accept them.

Q But you do not mean to say that Massachusetts is below the other states in its standards?

A Yes. That is just what I mean to say. While the

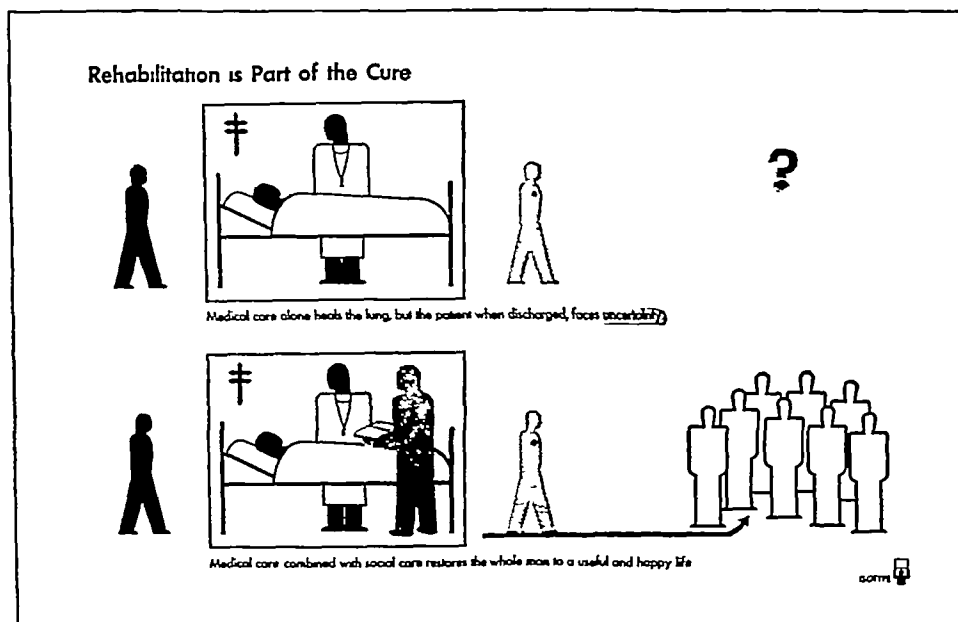
nents represent only a small fraction of the large number of handicapped persons and that resources are limited. The remedy for this lies in broadening the scope of rehabilitation service through legislation.

The California Bureau of Vocational Rehabilitation has at this time a live roll of 659 tuberculous patients and ex-patients. Each year since 1933 has seen an increase in the number enrolled. During this time 758 persons (31 per cent) out of a total of 2418 in training have been re-habilitated, which means, placed in a suitable job with a fair salary, and each year the proportion of those re-habilitated has increased.

How permanent is the rehabilitation of ex-patients? Of 209 individuals rehabilitated in Los Angeles County during the period of 1928 to 1936, 155 (74 per cent) are still employed, whereas in a control group of 98 individ-

proximately 8 per cent of our tuberculous patients start their training before discharge, either in one of the five sanatorium commercial classes conducted by the Bureau, or by means of correspondence courses, or through employment training in sanatorium jobs. The advantages of this early start are improved morale, service as a hardening process, shortening of period of continued training after discharge and often either immediate or at least quicker placement. Training is always in accordance with medical advice, starting with a few minutes daily and increasing as the patient's condition permits.

Training is usually provided after discharge and after a period of adjustment to home conditions. The start is on a part-time basis, increasing to full time as condition warrants, and provision is always made for medical follow up. Each training program is made to fit the par-



*This is Number 14 of a series of twenty isotype charts on tuberculosis. The original charts are in color each measuring 24 by 36 inches and are used by tuberculosis associations for the education of the general public.*

uals discharged from sanatoriums who had not received training the number still employed is 34 (34 per cent). Not so favorable was the discovery that about 20 per cent of the rehabilitated individuals had had relapses of their disease and 4 per cent died, though the work was not the cause of death.

Experienced counselors of the Vocational Rehabilitation Service make periodical visits to sanatoriums throughout the State. They counsel patients who have been selected by the medical director and who are deemed eligible and feasible with regard to future occupation. Occasionally, preliminary guidance interviews are given to patients not yet ready for decision but who need reassurance.

Vocational training is seldom a part of the sanatorium program. We believe that selected reading activities, adult education and occupational therapy fit better into the sanatorium situation, with as much prevocational emphasis as may be desirable in individual cases. Nevertheless training is occasionally provided for selected patients whose condition is at least quiescent and improving to indicate discharge within a reasonable time, and assuming that training facilities are or can be made available. Ap-

ticular needs, interests, and convenience of the individual trainee to the greatest extent possible, never do we try to fit the trainee into a cut-and-dried uniform program. Under these conditions we find that training may be successfully followed, this results in successful rehabilitations.—Reprinted from *Tuberculosis Abstracts*, January, 1939

## CORRESPONDENCE

### THE DOCTORS GREEN CROSS

*To the Editor* The green cross on the white field, which designates a doctor's automobile and which originated in Boston, is now in general use all over the country. I have been urged to record, from personal recollections of the circumstances, the story of its origin.

The device was first suggested by the late Dr. Samuel Crowell, who up to the time of his death lived and practiced in the Dorchester district of Boston.

In the early days of the automobile, a small group of the members of the Norfolk District Medical Society, including Dr. Crowell, and Dr. Arthur Perry and Dr. Joseph

ten years for whooping cough has been 44, for measles 37, for diphtheria 23 and for scarlet fever 14. All deaths from whooping cough have been among children under four.

#### EXPANSION OF MT SINAI HOSPITAL

A \$250,000 program for building improvements and expansion of Mt. Sinai Hospital, Hartford, has been announced. A campaign for funds will be formally launched in February. The present structure will be renovated and an east wing added, thus increasing the hospital bed capacity to more than 100. Clinical facilities will be enlarged and additional private rooms will be provided. The outpatient department will be expanded. The new wing, to be constructed of red brick with brownstone trim, will be three stories high and will provide about 22,000 additional square feet of space.

#### DEBATE ON SOCIALIZED MEDICINE

The Get Together Club of Hartford recently held a debate on the subject of socialized medicine at one of its regular monthly meetings. Dr. Creighton Barker, of New Haven, executive secretary of the Connecticut State Medical Society, presented the platform of organized medicine, while Dr. Kingsley Roberts, of New York, medical director of the Bureau of Co-operative Medicine, advocated health insurance under the co-operative plan. Disagreement between the two speakers centered around the point that salaried physicians would be inferior to fee paid physicians where the former are grouped together and paid fixed salaries through a third party.

#### DR NOVAK GUEST SPEAKER

Dr. Emil Novak, of Baltimore, was selected to be the guest speaker at the first public meeting sponsored by the Medical Information Bureau of the Hartford Medical Society and the Hartford County Medical Association. His subject was Cancer: A message of hope. About 2500 people from Hartford and the surrounding towns were present to hear Dr. Novak's very timely and interesting lecture.

#### LECTURE SERIES AT NEUROPSYCHIATRIC INSTITUTE

On November 2 the first of a series of staff lectures was held at the Neuropsychiatric Institute of the Hartford Retreat. The speaker was Dr. Lawrence Kolb, assistant surgeon general of the United States Public Health Service, and his subject 'Drug Addiction'. Dr. Kolb expressed the belief that due to the Harrison Narcotic Act of 1915, drug addiction is not increasing in the United States at present, except perhaps in the case of marijuana. On November 16 Dr. Bernard Dattner, of Vienna, spoke on Syphilis of the Nervous System. He outlined the methods used in fever therapy for cerebrospinal syphilis.

#### HARTFORD HOSPITAL STAFF APPOINTMENTS

The Board of Managing Directors of the Hartford Hospital at its annual meeting recently announced the appointment of the hospital staff for the ensuing year. Twenty-one promotions and four new members were announced. The new appointments, all as clinical assistants, follow: Dr. Frank O. Wood, Department of Obstetrics and Gynecology; Dr. Wendell C. Hall, Department of Radiology; Dr. William J. Neidinger, Department of Otorhinolaryngology; Dr. F. Earle Kunkel, Department of Dermatology.

#### APPOINTMENT OF NEW MEDICAL EXAMINER IN HARTFORD

Dr. Perry T. Hough was appointed medical examiner in Hartford in October to succeed Dr. Henry N. Costello. Dr. Hough is a graduate of Trinity College and McGill University Faculty of Medicine and served an internship at the Hartford Hospital. At present, Dr. Hough is assistant pathologist of the Hartford Hospital and pathologist of the Municipal Hospital, Hartford, and of the Manchester Memorial Hospital.

#### HEALTH OFFICERS APPOINTED

The following new appointments have been announced: Walter S. Lay, M.D., as health officer of Hamden; Josephine Evarts, M.D., as health officer of Kent; Reuben Rothblatt, M.D., as acting health officer of Willimantic; Samuel S. Fargo, M.D., as health officer of Pawcatuck; and Helen Baldwin, M.D., as health officer of Canterbury.

#### CONNECTICUT DEPARTMENT OF HEALTH PERSONNEL APPOINTMENTS

Ralph F. Sikes, M.D., has been appointed to the Bureau of Preventable Diseases during the absence of Charles E. McPartland, M.D., for advanced study in public health. B. Arthur Moxness, M.D., has been appointed under the merit system to the Bureau of Venereal Diseases as public health physician.

#### COUNSELING THE TUBERCULOSIS PATIENT

What becomes of the tuberculous patient after the doctor refers him to the sanatorium? In many communities sanatorium officials send progress reports to the practicing physician from time to time. Sometimes, however, the doctor is revisited by the patient whom he sent to the sanatorium months or years before, asking advice as to his future course. He may wish particular advice on the kind of work he may do safely. It may be helpful, therefore, to learn from a qualified official what provisions are made by the state for counseling and training tuberculous patients for suitable employment. Extracts of a paper (Counseling and training tuberculous patients for suitable employment. *Tr. Nat. Tuberc. A.*, 1938) by H. D. Hicker, chief of the Bureau of Vocational Rehabilitation of California, follow.

Not only medical skill is necessary to restore the tuberculous patient to a useful life, but also the aid of mental hygiene, social welfare, education, training and placement services. Each patient must be treated as an individual, yet one must remember that the individual is not an assembly of parts and functions and that, therefore, he must be treated as a whole. Consequently all workers in the field of tuberculosis must co-ordinate their services. Vocational rehabilitation is closely linked with medical and social services.

Under the Federal Rehabilitation Act of 1920 and the subsequent state rehabilitation acts, tens of thousands of men and women with physical disabilities of various types have achieved satisfactory vocational adjustment. It has been amply demonstrated that the rehabilitation program of vocational counseling, training and other related services can and does make physically impaired persons employable. Yet comparatively few tuberculous patients have received the benefits of the rehabilitation service. Among the reasons given for this lack are that the rehabilitation service has shared the widespread fear of this disease and the belief that very few cases recover sufficiently to be come employable. Another reason is that tuberculous pa-



matrix goes into solution. Hence, if we decalcify a stone, there is no longer any stone. This type of stone is not formed unless the urine is of such a composition as to cause precipitation of the crystalloid. Calcium phosphate and calcium carbonate stones are formed in an alkaline medium. A calcium oxalate stone will form in either acid or alkaline urine, and uric acid and cysteine stones are formed in acid urine.

*In vivo*, two possibilities of controlling stone formation present themselves. We can alter the composition of the diet and restrict the fluid, or we may be able to inject some dissolving fluid into the renal pelvis which will not harm the patient.

Since calcium carbonate is the commonest constituent of stones, we used this as a test substance. At pH 6.5 the solubility product of calcium carbonate is such that most of the ions precipitate out. At pH 4.0 the solubility product changes so that there is a greater tendency for the precipitated salt to dissolve, but an equilibrium is established which prevents its complete solution. If, to such a system, citrate ions are added, they form a complex soluble salt with the calcium ions, and the reaction can go in only one direction, namely to complete solution of the salt. At 40°C. the reaction progresses three times as fast as at room temperature.

*In vitro*, we have used an isotonic sodium citrate and citric acid solution at pH 4.0 in a constant exchange apparatus and have seen moderate sized stone completely dissolved in twelve to nineteen hours. Calcium oxalate stones, of course, are not affected.

These preliminary experiments suggest that the *in vivo* dissolving of stones is a possibility.

#### PRESACRAL NEURECTOMY FOR DYSMENORRHEA Dr Joe V Meigs

The treatment of dysmenorrhea is frequently unsatisfactory and limited to the use of antispasmodics, such as belladonna. In 1924 Koch performed the first presacral neurectomy and the operation has since met with considerable success—but always in combination with cervical dilatation, uterine suspension or some form of plastic operation. We have undertaken to use presacral neurectomy alone, and the first of 20 such cases has now gone seven years since operation.

The superior hypogastric plexus is essentially autonomic, containing fibers which mediate vasomotor control sphincter control and muscle tone. In addition it contains sensory fibers, for we have long known that crushing the plexus causes pain in the bladder. Endometrial biopsies also cause pain. Following operation we have found no pain on uterine scraping, though the backache of cervical dilatation persists.

While not especially difficult technically, the operation is tedious and time consuming, for the entire area between the bifurcation of the aorta and the bifurcation of both iliac arteries must be completely denuded of nerve fibers. Fibers which commonly pass beneath the aorta and those branches coming from the inferior mesenteric artery must not be overlooked.

Seventy five per cent of the operations have been completely and 10 per cent partially successful. The 3 unsuccessful cases included one patient with a small right cervix, one who continued to complain of pain in order to get operative sterilization and one in whom some fibers were apparently not cut. Three of the patients have subsequently borne children. One had less pain than with previous deliveries, one had no cramps but only a rhythmic backache during labor and one seemed to have the usual amount of labor pain. Several of the patients

previously complaining of dyspareunia have reported no such trouble since operation.

Hence we believe that presacral neurectomy by itself is satisfactory therapy in cases of the essentially uterine types of dysmenorrhea.

#### CARCINOMA OF THE LIP Dr Grantley Taylor

The problem of treatment of primary cancer of the lip is fairly well settled as being a matter of adequate surgical excision and irradiation. The question of what to do in the neck is still controversial, however. For this reason 600 cases of cancer of the lip at the Huntington Memorial and Pondville hospitals were studied to find out what characteristics of the primary lesion would affect the presence or absence of lymph node metastases. The conclusions were as follows.

- (1) The larger the primary lesion the more likely is the presence of cervical node metastases
- (2) Though somewhat less dependable due to poor histories, the longer the duration of the primary lesion the more likely the metastases
- (3) The more malignant the growth the more likely the metastases. (Slides from the primary lesions were all examined by Drs. Benjamin Castleman and Shields Warren.) This ranged from 6 per cent metastases for Grade I lesions to 32 per cent metastases for Grade III lesions. Fortunately, cancer of the lip is usually a low grade tumor
- (4) Recurrence of the primary lesion is more likely to be associated with metastases
- (5) The larger the palpable lymph nodes the more likely the presence of metastases. This ranged from 8 per cent with non palpable nodes to 91 per cent with 2-cm. nodes. Frequently, however, large lymph nodes are only inflammatory

Thus we can make no laws about dissection of the neck in cancer of the lip. It is probably best to wait and see and thus avoid unnecessary surgery—but not to wait until the possibility of cure is unlikely. Sixty four per cent of the nodes were positive when neck dissection was delayed, so that there seems to be less likelihood of cure if we wait for clinical nodes to appear. If the patient is dependable and can be closely followed and if the primary lesion is small, waiting is wise. If undependable, neck dissection must be resorted to immediately.

#### ADRENAL CORTICAL TUMORS Dr Oliver Cope.

We now recognize three syndromes of adrenal cortical hypersecretion: virilism in the female, the basophilism syndrome described by Cushing, and feminization in the male.

Diagnosis is difficult in the early stages for there are no fool proof signs. Even androgen assays of the urine are equivocal in borderline cases. Enlargement of the adrenal gland is the most important sign but it is not palpable and cannot be seen on x-ray films until it is quite large and distorts or shifts the renal shadow.

For this reason, with the co-operation of Drs. E. D. Churchill and Richard Schatzki, we have studied 56 cases using the perirenal air insufflation technic. In 15 cases the adrenal was seen at operation and in 1 at postmortem, so that the apparent size on the film and the actual size could be compared. In all cases pyelograms gave no information. Both sides were always examined. Tumors when present were always visualized. Exclusion of tumor when suspected saved many exploratory laparotomies. A check on the size of the non tumorous gland before removal of

Stedman, both of Jamaica Plain, with a few others, all of whom are now dead, waited upon the Board of Street Commissioners of that day, asking for some sort of preferential consideration for doctors' cars on the road. As a result of this conference, the commissioners agreed to allow doctors whose cars should bear a distinguishing device to park left wheel to the curb in certain suburban areas while making professional calls.

The question then arose as to what distinguishing device should be adopted. A red cross seemed to be the favorite, but Dr. Crowell pointed out that the red cross belonged to the Red Cross and not to the medical profession. He suggested that since green had been the color of the Medical Corps of the Union Army during the Civil War—green sash for commissioned officers and green stripes on breeches for enlisted personnel—that a green cross on a white field would be appropriate. This seemed to be acceptable to all, and on December 10, 1908, the Board of Street Commissioners adopted and promulgated a regulation embodying the above provisions.

Twenty years later, on September 21, 1928, when the Boston traffic regulations were revised, that regulation which had given to doctors' cars a special parking privilege was rescinded. Today, while the green cross has no official status, at least in Boston where it had its birth, it is still widely honored by traffic officers, who for the most part are very considerate of the traffic problems of the doctor.

H. F. R. WATTS, M.D.

Health Department,  
City Hall Annex,  
Boston

## REPORTS OF MEETINGS

### SUFFOLK DISTRICT MEDICAL SOCIETY

The Suffolk District Medical Society met at the Boston Medical Library on Wednesday, November 30, 1938, under the chairmanship of Dr. Reginald Fitz. The program consisted of a presentation of recent work done at the Massachusetts General Hospital.

#### PULMONARY EMBOLI: PATHOLOGICAL ASPECTS. Dr. Benjamin Castleman

Careful correlations between x-ray findings and postmortem findings are usually impossible because of the pathologic changes that occur between the taking of good x-rays and death, the unsatisfactory quality of antemortem films which of necessity must be portable, and the collapsed state of the lungs post mortem.

To circumvent these difficulties we are now taking anteroposterior and lateral postmortem 7-foot chest plates with the patient upright. At postmortem the lungs and trachea are removed together, formalin is then poured into the trachea until the lungs are distended to normal size, when the trachea is tied off. The entire preparation is then put in formalin and a week later the lungs are sectioned and an attempt made to account for every shadow on the films. Lungs from 400 cases have been examined.

In 3500 routine autopsies, 9 per cent showed emboli or infarction of the lung, and in 3.5 per cent the embolus was the cause of death. In this series of 400 autopsies, 14 per cent showed emboli or infarction, an increase of 50 per cent. Molds were made of the shape of each one, and none showed the traditional triangular shape. Frequently the costophrenic angle infarcts showed a convexity toward the hilum. All infarcts were peripheral, that is,

on a pleural surface of the lung, and they can occur wherever two surfaces of pleura meet.

From this work and simultaneous experimental work, we now have a fairly clear picture of what transpires when an embolus reaches the lung. The first day the infarcted lung still contains a good deal of air in the alveoli and there is no sharp line of demarcation between infarcted and normal lung, nor is there any destruction of alveolar walls. By the third day there are still some air-containing alveoli, but a sharp line of demarcation is present and red-blood cells and white-blood cells are found in the alveoli and in the walls. Still later, the infarcted area becomes encapsulated and there is almost complete necrosis of the alveolar walls. Complete healing is evidenced by an organized fibrous scar—which shows as a linear shadow on the x-ray film.

This complete progressive picture, however, is only seen in a lung previously damaged, as in chronic congestion, and this we call a true infarct. If the lung is essentially normal, the process only goes as far as edema and hemorrhage into the alveoli, which still contain some air, it then resolves without ever developing necrosis of the alveolar walls. This we speak of as incomplete infarction. In such cases the x-ray film shows only a transient shadow, which is not very dense and is in keeping with the pathologic picture.

Postoperative and postpartum patients frequently have signs and symptoms of pulmonary infarction, show a vague shadow on x-ray for just a few days and never develop signs of fluid. These patients do not die, so we never see the lesions. If these were true infarcts,—that is, had alveolar wall necrosis,—they would heal by organization and last longer according to x-ray. Hence, they are probably cases of incomplete infarction. We have had a chance to see one such postpartum infarct,—death was for another reason,—which showed the typical hemorrhage and edema in the alveoli, without any destruction of the wall.

Pulmonary infarcts, then, can occur in anyone and the outcome depends not on the size of the embolus but on the previous condition of the lung.

#### PULMONARY EMBOLI: RADIOLOGICAL ASPECTS. Dr. Aubrey O. Hampton

We have been able to demonstrate that the antemortem and postmortem films of the lung are essentially the same, for the fundamental physical principles are unchanged. Acute infarcts contain air, so we do not see a dense shadow, and for this reason such shadows are difficult to interpret. X-rays of infiltrated lungs show infarction shadows better, usually with a convexity toward the lung root. All infarcts occur where two pleural surfaces meet. Almost none are triangular in shape but conform to the shape of the portion of lung infarcted. True infarcts which heal usually leave a linear scar with a slight dimple at the pleural surface.

This study has taught us to differentiate complete and incomplete infarction and to realize that the latter is much commoner than we thought. Many people who come to the clinic with a history of pleurisy and hemoptysis and have an x-ray shadow which clears rapidly are diagnosed as having tuberculosis. Subsequent check has shown a phlebitis and a course consistent with pulmonary infarction.

#### IN VITRO DISSOLUTION OF KIDNEY STONES. Dr. Fuller Albright.

Renal stones are composed of an organic matrix and a precipitated crystalloid. If the crystalloid is removed the

## NOTICES

MASSACHUSETTS CENTRAL  
HEALTH COUNCIL

The annual meeting of the Massachusetts Central Health Council will be held in the Sheraton Salon of the Hotel Sheraton, 91 Bay State Road, Boston, Thursday evening, February 16, at 7 00 The Honorable Christian D Herter, speaker of the House of Representatives, will speak on Legislative Procedure

The usual business meeting and election of officers will be held

## SAMUEL D GROSS PRIZE

The Samuel D Gross Prize of the Philadelphia Academy of Surgery, amounting to fifteen hundred dollars, will be awarded in 1940 The conditions annexed by the testator are that the prize shall be awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in surgical pathology or surgical practice founded upon original investigations, the candidates for the prize to be American citizens

It is expressly stipulated that the competitor who receives the prize shall publish his essay in book form, and that he shall deposit one copy of the work in the Samuel D Gross Library of the Philadelphia Academy of Surgery, and that on the title page it shall be stated that to the essay was awarded the Samuel D Gross Prize of the Philadelphia Academy of Surgery

The essays, which must be written by a single author in the English language, should be sent to the Trustees of the Samuel D Gross Prize of the Philadelphia Academy of Surgery, care of the College of Physicians, 19 S 22d Street, Philadelphia, on or before January 1, 1940

Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer No envelope will be opened except that which accompanies the successful essay

The committee will return the unsuccessful essays if reclaimed by their respective writers, or their agents, within one year The committee reserves the right to make no award if the essays submitted are not considered worthy of the prize.

MEDICAL CLINIC AT THE PETER BENT  
BRIGHAM HOSPITAL

At 3 30 p m on Thursday, February 16, in the amphitheater of the Peter Bent Brigham Hospital, Dr Marshall N Fulton, associate in medicine, Harvard Medical School, and physician, Peter Bent Brigham Hospital, will give a medical clinic Practitioners and medical students are cordially invited to attend.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, February 14, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance) at 8 15 p m

## PROGRAM

Presentation of cases

Forsan et Haec Olim Meminisse Juvabit? Dr Reginald Fitz.

Medical students and physicians are cordially invited to attend

ROBERT M ZOLLINGER, M.D., Secretary

## HARVARD MEDICAL SCHOOL

A lecture on 'The Physiological Effects of Compressed Air' will be given by Dr Edgar M. End, of Marquette University School of Medicine, in Amphitheater C of the Harvard Medical School, on Tuesday, February 14, at 5 00 p m

NEW ENGLAND SOCIETY  
OF PHYSICAL MEDICINE

The regular meeting of the New England Society of Physical Medicine will be held at the Hotel Kenmore, Boston, on Wednesday evening, February 15, at 8 o'clock. The Council will meet at 6 00, and this will be followed by an informal dinner at 6 30

Dr C Guy Lane will speak on 'Indications for the Use of Physical Agents in Dermatology' This will be followed by general discussion

All members of the medical profession are cordially invited to attend

WILLIAM D McFEE, M.D., Secretary

NEW ENGLAND PATHOLOGICAL  
SOCIETY

The next regular meeting of the New England Pathological Society will be held at the Massachusetts General Hospital, on Thursday, February 16, at 8 00 p m

## PROGRAM

Correlation of Postmortem Chest Teleroentgenograms with Autopsy Findings, with Special Reference to Pulmonary Embolism and Infarction. Dr Benjamin Castleman and Dr Aubrey O Hampton.

Clinical and Hematological Aspects of Early Benzol Poisoning Dr Francis T Hunter

Histological Studies of Chronic Benzol Poisoning Dr Edward A Gall and Dr Tracy B Mallory

Physicians and medical students are cordially invited to attend.

## NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital, on Monday, February 27, at 8 15 p m

## PROGRAM

The Surgical Treatment of Patent Ductus Arteriosus Dr R. E. Gross (by invitation)

Observations on the Dynamics of the Circulation in Patent Ductus Arteriosus Dr E. P Eppinger

The Reaction of the Cardiovascular System of Dogs to Intravenous Infusion Drs R L Swank, A Yeomans and R. R. Porter (by invitation)

The Significance of Auricular Standstill Dr F F Rosenbaum (by invitation)

Some Notes on the Prognosis of Rheumatic Heart Disease. Dr S A Levine.

The discussion on the first three papers will be opened by Dr C Sidney Burwell Interested physicians and medical students are invited to attend

EDWARD F BLAND, M.D., Secretary

## NEW ENGLAND HOSPITAL ASSOCIATION

The annual meeting of the New England Hospital Association will be held at the Hotel Statler, Boston, on Thursday Friday and Saturday, March 9 10 and 11

A G ENGELBACH M.D. Secretary

the tumor-bearing gland was possible. In one instance a subtotal resection of the neoplastic gland was done because the other gland showed almost complete atrophy and seemed incapable of supporting life by itself.

Several instances of death from the procedure have been reported, presumably due to air embolism. We believe that we can prevent such a catastrophe by taking ten minutes to inject the air and using only half the usual amount. Our one untoward result was a large hematoma under the renal capsule from puncturing the capsule with the needle, and we believe we can now avoid such an accident. This case did not die of the injury but during a paroxysm of hypertension due to excessive secretion of adrenalin several days after the procedure.

#### ELECTRO-ENCEPHALOGRAPHY Dr Robert S Schwab

The brain is the seat of electrical activity just as is the heart, though we need four times the amplification necessary for an electrocardiogram to demonstrate this activity. Such waves were first demonstrated by placing an electrode over the occiput, with the eyes closed. When a light is flashed into the eyes the waves disappear. These waves were first called brain waves, are of low amplitude and occur about twenty times a second.

In the past two years we have taken electro-encephalograms on 960 cases. This is done by attaching three electrodes to the skin of the head and placing the patient in a metal cage which shields the instrument and patient from interfering electrical currents. In 90 per cent of the cases with clinical epilepsy we have found the typical broad, high amplitude waves, which occur about fifty times a minute. In 80 per cent of the cases showing focal clinical signs we have checked on the location of the pathologic portion of brain. Seventy five per cent of the patients with clinically diagnosed brain tumors have shown corroborative electro-encephalographic changes. The apparatus is still crude and difficult to work with and artefacts are a constant pitfall, but the method shows great promise of future value.

#### PYELITIS Dr Harold L Higgins

Pathologists have shown us that pyelitis is not an ascending infection from the bladder, nor localized to the pelvis of the kidney, but is really an interstitial inflammation—a suppurative nephritis involving the whole kidney, though the degree of involvement varies a great deal. I believe that all cases are due to partial or complete ureteral obstruction. The obstruction may be anatomical, such as one due to an aberrant renal artery, pregnant uterus, tumor, or stone, abscess or kink of the ureter, or physiological, such as one due to spasm or edema of the ureter. In acute hemorrhagic nephritis we see only red cells in the urine at first and later both red cells and leukocytes. We also get edema of the kidney causing oliguria and general body edema, hence, there is probably also edema of the ureter which may give rise to a secondary pyelitis from obstruction. Virus infections are frequently associated with edema. Such edema would probably account for the pyelitis of measles.

The chief bacteriologic agents incriminated in pyelitis are the intestinal bacteria, such as *Bacillus coli* and *Streptococcus faecalis*. The kidneys probably eliminate these organisms physiologically at times though not regularly. In the presence of such a set up, obstruction and stasis will result in ordinarily harmless bacteria becoming pathogens and giving rise to inflammation.

Treatment with sulfanilamide reduces the virulence of the organism, and if the obstruction is meanwhile relieved, the patient is cured. If not, we get a recurrence

when the drug is stopped. Mandelic acid per se probably does nothing, but the limitation of fluids and the attendant dehydration release obstruction by getting rid of the ureteral edema.

In general almost all cases of pyelitis are the result of obstruction to urinary outflow and associated infections due to the normal intestinal bacteria in the kidney and urine.

#### RECENT OBSERVATIONS ON CHRONIC INDUSTRIAL BENZOL POISONING Dr Francis T Hunter

To date, the literature has been filled with incomplete conflicting reports of the results of benzol poisoning. The following are some random and incomplete observations we have made in the study of 79 workers exposed to benzol. All the cases were studied by a detailed history, physical examination and a complete hematological work up. We have 7 cases with pathologic material—1 postmortem bone marrow biopsy, 1 bone marrow biopsy and 5 autopsies. In addition we have the material from 6 cases autopsied between 1920 and 1924. Certain previously known facts have been reconfirmed.

1 Fourteen cases (75 per cent) had red-cell counts above 5,200,000. The highest was 7,300,000 on three different occasions with a white-cell count of 12,000 with 63 per cent polymorphonuclears. (One week after removal from exposure his red-cell count dropped to 5,200,000.)

2 Twenty-two cases (27 per cent) showed young cells in their smears, that is, myeloblasts and normoblasts. These were workers who had not had excessive exposure and showed no signs of ill health.

3 Twenty-five per cent of the cases showed eosinophils (the highest being 23 per cent).

4 Hyperplastic bone marrow was found to be associated with the picture of aplastic anemia in the peripheral blood stream.

In addition the following new facts have come to light.

1 Anemia with an increased white-cell count may occur. Twenty-three per cent showed myeloblasts, and 6 per cent normoblasts.

2 There may be no anemia but a white-cell count as high as 45,000. The differential count shows chiefly lymphocytes and the stained smear is similar to that of a case of lymphatic leukemia. (Three months after removal from exposure the blood picture was normal.)

3 There may be a macrocytic, pernicious-anemia like picture.

4 Only in the early stages may one have an increased white-cell count with increased polymorphonuclears and the rest of the blood picture normal.

5 Marked splenomegaly and extreme hyperplasia of the bone marrow may occur.

6 In the same individual the bone marrow may be hyperplastic in some places and aplastic in others.

7 Clinical benzol poisoning may develop eight to eighteen months after removal from exposure. Presumably the bone marrow is adequate for normal life, but when placed under stress it cannot keep up.

8 Long exposure, that is, as much as twelve years, may result only in a hyperplastic bone marrow. In other patients a short exposure may cause death, with an aplastic anemia. (In mice we know that leukemia can develop long after exposure to benzol has ceased.)

The time element is important and symptoms may be delayed a long time. Hence, histories must be very detailed.

## NOTICES

MASSACHUSETTS CENTRAL  
HEALTH COUNCIL

The annual meeting of the Massachusetts Central Health Council will be held in the Sheraton Salon of the Hotel Sheraton, 91 Bay State Road, Boston, Thursday evening, February 16, at 7 00 The Honorable Christian D Herter, speaker of the House of Representatives, will speak on Legislative Procedure

The usual business meeting and election of officers will be held.

## SAMUEL D GROSS PRIZE

The Samuel D Gross Prize of the Philadelphia Academy of Surgery, amounting to fifteen hundred dollars, will be awarded in 1940 The conditions annexed by the testator are that the prize shall be awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in surgical pathology or surgical practice founded upon original investigations, the candidates for the prize to be American citizens

It is expressly stipulated that the competitor who receives the prize shall publish his essay in book form, and that he shall deposit one copy of the work in the Samuel D Gross Library of the Philadelphia Academy of Surgery, and that on the title page it shall be stated that the essay was awarded the Samuel D Gross Prize of the Philadelphia Academy of Surgery

The essays, which must be written by a single author in the English language, should be sent to the Trustees of the Samuel D Gross Prize of the Philadelphia Academy of Surgery, care of the College of Physicians, 19 S 22d Street, Philadelphia, on or before January 1, 1940

Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer No envelope will be opened except that which accompanies the successful essay

The committee will return the unsuccessful essays if reclaimed by their respective writers, or their agents, within one year The committee reserves the right to make no award if the essays submitted are not considered worthy of the prize.

MEDICAL CLINIC AT THE PETER BENT  
BRIGHAM HOSPITAL

At 3 30 p m on Thursday, February 16, in the amphitheater of the Peter Bent Brigham Hospital, Dr Marshall N Fulton, associate in medicine, Harvard Medical School, and physician, Peter Bent Brigham Hospital, will give a medical clinic Practitioners and medical students are cordially invited to attend.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, February 14, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance) at 8 15 p m

## PROGRAM

Presentation of cases

Forsan et Haec Olim Memnissie Juvabit? Dr Reginald Fitz

Medical students and physicians are cordially invited to attend.

ROBERT M ZOLLINGER, M D, *Secretary*

## HARVARD MEDICAL SCHOOL

A lecture on 'The Physiological Effects of Compressed Air' will be given by Dr Edgar M End, of Marquette University School of Medicine, in Amphitheater C of the Harvard Medical School, on Tuesday, February 14, at 5 00 p m

NEW ENGLAND SOCIETY  
OF PHYSICAL MEDICINE

The regular meeting of the New England Society of Physical Medicine will be held at the Hotel Kenmore, Boston, on Wednesday evening, February 15, at 8 o'clock. The Council will meet at 6 00, and this will be followed by an informal dinner at 6 30

Dr C Guy Lane will speak on "Indications for the Use of Physical Agents in Dermatology" This will be followed by general discussion

All members of the medical profession are cordially invited to attend

WILLIAM D McFEE, M D, *Secretary*

NEW ENGLAND PATHOLOGICAL  
SOCIETY

The next regular meeting of the New England Pathological Society will be held at the Massachusetts General Hospital, on Thursday, February 16, at 8 00 p m

## PROGRAM

Correlation of Postmortem Chest Teleroentgenograms with Autopsy Findings, with Special Reference to Pulmonary Embolism and Infarction. Dr Benjamin Castleman and Dr Aubrey O Hampton.

Clinical and Hematological Aspects of Early Benzol Poisoning Dr Francis T Hunter

Histological Studies of Chronic Benzol Poisoning Dr Edward A. Gall and Dr Tracy B Mallory

Physicians and medical students are cordially invited to attend

## NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital, on Monday, February 27, at 8 15 p m

## PROGRAM

The Surgical Treatment of Patent Ductus Arteriosus Dr R. E. Gross (by invitation)

Observations on the Dynamics of the Circulation in Patent Ductus Arteriosus. Dr E P Eppinger

The Reaction of the Cardiovascular System of Dogs to Intravenous Infusion Drs R. L. Swank, A. Yeomans and R. R. Porter (by invitation)

The Significance of Auricular Standstill Dr F F Rosenbaum (by invitation)

Some Notes on the Prognosis of Rheumatic Heart Disease. Dr S A Levine.

The discussion on the first three papers will be opened by Dr C. Sidney Burwell Interested physicians and medical students are invited to attend.

EDWARD F BLAND, M D, *Secretary*

## NEW ENGLAND HOSPITAL ASSOCIATION

The annual meeting of the New England Hospital Association will be held at the Hotel Statler, Boston, on Thursday Friday and Saturday, March 9, 10 and 11

A G ENGELBACH, M D, *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, FEBRUARY 13

## TUESDAY FEBRUARY 14

- \*9 10 a m Joseph H Pratt Diagnostic Hospital The Significance of Anal Bleeding Dr E. T. Whitney
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 5 p m Lecture on the Physiological Effects of Compressed Air Harvard Medical School Amphitheater C
- \*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital Amphitheater

## WEDNESDAY FEBRUARY 15

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S. J. Thannhauser
- \*12 m Clinicopathological conference. Children's Hospital Amphitheater
- \*8 p m New England Society of Physical Medicine Hotel Kenmore

## THURSDAY FEBRUARY 16

- 8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Peter Bent Brigham Hospital
- \*9 10 a m Joseph H Pratt Diagnostic Hospital. Electrocardiographic Changes in Pericarditis. Dr C. P. Roberts
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital
- 5 p m George W. Gay Lecture on Medical Ethics Harvard Medical School Amphitheater C.
- 7 p m Massachusetts Central Health Council Hotel Sheraton 91 Bay State Road.
- \*8 p m New England Pathological Society Massachusetts General Hospital

## FRIDAY FEBRUARY 17

- \*9 10 a m. Joseph H Pratt Diagnostic Hospital Differential Diagnosis of Coronary Thrombosis Dr Cadis Phipps
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Clinical meeting of the Children's Medical Service Massachusetts General Hospital Ether Dome
- 12 m Urological conference Massachusetts General Hospital lower outpatient amphitheater

## SATURDAY FEBRUARY 18

- 9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S. J. Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

## SUNDAY FEBRUARY 19

- 4 p m Illustrated public health lecture, Faulkner Hospital auditorium Girth Control Dr Arthur A. Cushing
- 4 p m Free public lecture Harvard Medical School Amphitheater of Building D The Significance of Syphilis and Other Venereal Diseases Dr William C. Quinby

\*Open to the medical profession

- FEBRUARY 12—Lecture at the Faulkner Hospital Page 971 issue of December 15
- FEBRUARY 12—Free Public Lecture Harvard Medical School Page 1056 issue of December 29
- FEBRUARY 12—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29
- FEBRUARY 12—Salem Hospital Public Health Lecture Page 126 issue of January 19
- FEBRUARY 14—Harvard Medical Society Page 267
- FEBRUARY 14—Harvard Medical School Lecture on the Physiological Effects of Compressed Air Page 267
- FEBRUARY 15—New England Society of Physical Medicine Page 267
- FEBRUARY 16—Medical Clinic Peter Bent Brigham Hospital Page 267
- FEBRUARY 16—Massachusetts Central Health Council Page 267
- FEBRUARY 16—New England Pathological Society Page 267
- FEBRUARY 16—George W. Gay Lecture on Medical Ethics Page 218 issue of February 2.
- FEBRUARY 17—Urological Conference. Massachusetts General Hospital
- FEBRUARY 22—Alumni Day New York University College of Medicine. Page 173 issue of January 26
- FEBRUARY 27—New England Heart Association Page 267
- MARCH 9—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill
- MARCH 9 11—New England Hospital Association. Page 267
- MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8
- MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19
- MARCH 27 31—American College of Physicians. Page 36 issue of July 7
- MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29
- MAY 15-16—American Board of Obstetrics and Gynecology Inc Page 218 issue of February 2.
- MAY 15-19—American Medical Association St. Louis, Missouri
- JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association Page 936, issue of December 8.

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association. Page 863 issue of November 24

FALL 1939—Temperature Symposium Page 218 issue of February 2.

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

MARCH 1—Lynn Hospital. Clinic at 5 p m. Dinner at 7 p m. Speaker Dr John Rock Subject. Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m. Dinner at 7 p m Speaker Dr Ethan Allan Brown. Subject. Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced.

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced.

## WORCESTER

MARCH 8—Worcester Memorial Hospital

APRIL 12—Worcester Hahnemann Hospital.

MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6 30 p m which is followed at 7 30 p m. by the business and scientific sessions

## BOOK REVIEWS

*Your Chest Should Be Flat The deep chest makes better soil for tuberculosis* S. A. Weisman. 145 pp Philadelphia, London, New York and Montreal J. B. Lippincott Co, 1938 \$2.00

The title of this small book tells practically the whole story The book deals with the physical development of the chest and points out that the deep chest makes better soil for tuberculosis

The author has approached the problem of tuberculosis from a very interesting angle, although the relation of chest development and tuberculosis has been discussed for very many years The author may be able to prove his point if he follows the group of apparently normal children in whom he found round, deep, chests, and later cites a lower incidence of tuberculosis in these patients as compared with that in those who were flat-chested. Furthermore, evidence to the effect that round chests are commonly found among those who now have and have had tuberculosis for some time would be in favor of his theory

The subject is a fascinating one, and it is hoped that the author will follow up this work and subsequently publish more facts

*Feminine Hygiene in Marriage* A. F. Niemoeller 155 pp New York Harvest House, 1938 \$2.00

This tiny volume contains little of value to anyone with a modicum of information regarding the female and her hygiene, whether such modicum was obtained through the usual medical channels or by that peculiar fate which permits one to be a female.

There is little to recommend the book to anyone in the medical profession and less to anyone not so engaged.

*Virus Diseases and Viruses* Patrick P. Laidlaw 52 pp Cambridge University Press, 1938 90 cents.

This small brochure is most readable and informative. Sir Patrick Laidlaw in the Rede Lecture of 1938 has admirably given a broad view to the study of viruses and has summarized the important advances made in this field of investigation

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## EXPERIMENTAL STUDIES CONCERNING THE NATURE OF HYPERTENSION\*

### Their Bearing on Surgical Treatment

STANLEY J G NOWAK, M.D.,† AND IRVING J WALKER, M.D.‡

BOSTON

**E**XPERIMENTAL investigation into the cause of hypertension has followed two lines, one dealing with mechanisms producing increased vasomotor activity, the other with the kidney as a possible source of a hypertensive substance

#### HYPERTENSION DUE TO INCREASED VASOMOTOR ACTIVITY

*Carotid-Sinus Denervation and Aortic-Depressor Nerve Section* Attempts at producing increased vasomotor tone analogous to essential hypertension have met with success through carotid-sinus denervation and section of the aortic-depressor nerve. First described by Hering's pupils, Koch and Mies,<sup>1</sup> in the rabbit in 1929 and by Heymans<sup>2</sup> in the dog in 1931, this method has been corroborated by Kremer, Wright and Scarff<sup>3</sup> and by one of us (S J G N<sup>4</sup>). The principle underlying this experimental means for producing hypertension depends upon the interruption of afferent nerve impulses which normally buffer or depress the activity of the circulatory centers in the medulla. Removal of these impulses permits the vasoconstrictor, cardio-accelerator and adrenine-secreting centers to exert their maximal effects, with a resulting elevation of blood pressure in dogs from the average normal level of 130 mm of mercury to as high as 250 mm. The majority of these animals show oscillations in blood-pressure values similar to those frequently seen in clinical essential hypertension. It has been demonstrated that the hypertension so produced may persist for three years or more.<sup>4</sup>

The obvious advantage of using this group of animals for study is that they represent a hypertensive state due chiefly to vasoconstriction and

to a lesser extent to increased secretion of adrenine and cardiac acceleration, factors which are undoubtedly responsible for clinical essential hypertension. It should not be inferred, however, that the clinical condition is due to decreased activity or suppression of the carotid-sinus and aortic-depressor nerve mechanisms. The similarity lies in the end result rather than in the cause.

*Chronic Cerebral Anemia* The conception that acute cerebral anemia and asphyxia produce a temporary increase in blood pressure through increased vasomotor activity has been frequently demonstrated since the early days of physiology.<sup>5,6</sup> By progressive ligation of the various cerebral arteries one of us (S J G N) demonstrated for the first time that chronic cerebral anemia may result in chronic hypertension (Fig 1). The

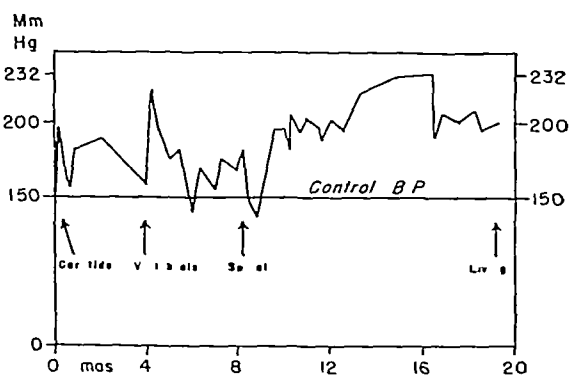


Figure 1 Hypertension Produced by Ligation of Cerebral Arteries (Dog 20)

difficulties attendant upon this experimental production of chronic hypertension lay in the extraordinary ability of the dog to re-establish practically normal cerebral circulation through well-developed anastomoses, in spite of ligation of both external and internal carotids, both vertebral arteries and the anterior spinal artery.

Presented at the annual meeting of the New England Surgical Society, Boston, September 30, 1935. From the Surgical Research Laboratory and the Fifth Surgical (Harvard) Service, Boston City Hospital. Aided in part by a grant from the Permanent Charity Fund of Harvard Medical School.

†Associate in surgery, Harvard Medical School, assistant surgeon, Boston City Hospital.

‡Clinical professor of surgery, Harvard Medical School, surgeon-in-chief, Fifth Surgical (Harvard) Service, Boston City Hospital.

*Increased Intracranial Pressure* Also in line with this work are the investigations on the effect of increased intracranial pressure on arterial tension. According to Cushing,<sup>7</sup> cerebral compression produces hypertension by virtue of cerebral anemia. His observations in acute experiments and clinical studies have been confirmed by Dixon and Heller,<sup>8</sup> who have produced chronic hypertension by increasing intracranial pressure by means of injecting an inert substance, kaolin, into the fourth ventricle of rabbits.

The mechanism by which cerebral anemia stimulates the vasomotor center has been recently shown by Raab<sup>9</sup> to be due to acidosis of this center, its perfusion by acids, such as lactic acid, has resulted in acute hypertension. On the other hand, perfusion with alkaline solutions brought about a lowering of blood pressure.

*Experimental Arteriosclerosis* Handovsky and Goormaghtigh<sup>10</sup> of Heymans's laboratory have observed hypertension following the production of marked arteriosclerosis in dogs by means of the feeding of vitamin D combined with thyroidectomy. It is probable that this hypertension is due to increased activity of the vasomotor center in response to augmented peripheral resistance.

#### RENAL HYPERTENSION

Since the postulation made by Johnson<sup>11</sup> in 1868, based on clinical observations, that the diseased kidney liberates a vasoconstrictor substance, many investigators have attempted to isolate this hypertensive factor. The first of these investigations was carried out in 1898 by Tigerstedt and Bergman,<sup>12</sup> who extracted a pressor substance from normal rabbits' kidneys which they called "rennin." Similar extracts have been described by Pearce,<sup>13</sup> Bingel and Strauss<sup>14</sup> and others. Recently Landis and his co-workers<sup>15</sup> have isolated a saline kidney extract in rabbits which, on injection into normal unanesthetized rabbits, elevated the blood pressure without diminishing the skin temperature. This absence of a change in skin temperature, indicating as it does undiminished peripheral flow, is characteristic of most forms of human hypertension. It is thus distinctly different from the group of hypertensive substances such as adrenalin, tyramine, pituitrin and so forth which produce hypertension with disproportionate increase of peripheral resistance and therefore of blood flow.

Another approach to the kidney as an etiologic factor in hypertension has been the attempt to establish high blood pressure in animals by inducing changes in the kidney. These changes have been accomplished by the following methods:

- Resection of large portions of both kidneys.<sup>16</sup>
- Ligation of branches of the renal artery.<sup>17, 18</sup>
- Partial occlusion of the renal artery or its branches.<sup>19</sup>
- Partial occlusion of the renal vein.<sup>20</sup>
- Partial obstruction of the ureters.<sup>21</sup>

The outstanding experimental work in this field is that of Goldblatt and his co-workers,<sup>19</sup> who have produced a marked degree of hypertension in dogs by partially occluding the renal arteries with adjustable metal clamps. These investigators have produced striking elevations of blood pressure in their dogs, as high as 250 to 300 mm of mercury, for as long as fifteen months.

The nature of the hypertension caused by renal ischemia is revealed by the investigations of Houssay<sup>22</sup> and Blalock and Levy,<sup>23</sup> who successfully transplanted one ischemic kidney into the neck of a dog by anastomosing the renal with the carotid-jugular vessels. The development of hypertension after the transplantation and its abolition by removal of the transplanted kidney point definitely to the kidney tissue as a primary source of the pressor substance.

There is contradictory evidence as to the ability of extracts of the ischemic kidneys to produce hypertension in animals. Harrison, Blalock and Mason<sup>24</sup> and Prinzmetal and Friedman<sup>25</sup> were able to demonstrate hypertensive responses to the injection of these extracts. Page,<sup>26</sup> on the other hand, obtained entirely negative results.

That the endocrine glands are definitely concerned in hypertension of renal ischemic origin is borne out by the findings of Page and Sweet,<sup>7</sup> who showed that this type of hypertension is reduced to normal by removal of the pituitary gland. Goldblatt<sup>28</sup> and Blalock and Levy<sup>23</sup> showed that removal of both adrenal glands also causes a reduction of renoischemic high blood pressure to normal.

These important demonstrations suggest the possibility that hypertension of renal origin is due to a hormone which has its origin in either of these glands and which is activated by a substance liberated by a diseased or ischemic kidney.

#### EFFECT OF VARIOUS SYMPATHETIC PROCEDURES IN EXPERIMENTAL "ESSENTIAL" HYPERTENSION PRODUCED BY CAROTID-SINUS DENERVATION AND SECTION OF THE AORTIC-DEPRESSOR NERVE

In 1923 Daniélopou<sup>9</sup> and Brüning<sup>30</sup> made independent suggestions of the possible value of splanchnic-nerve resection in arterial hypertension. Unilateral resection for this condition was first performed in 1930 by Pieri.<sup>31</sup> In 1934 Craig and Brown<sup>32</sup> resorted to bilateral splanchnic resection. This field has been extended by Fralick



and Peet,<sup>33</sup> Smithwick,<sup>34</sup> Page and Heuer<sup>35</sup> and others

In 1930 Adson and Craig<sup>36</sup> and in 1937 Page and Heuer<sup>37</sup> resorted to extensive ventral rhizotomy in order to obtain a larger area of vasodilatation than that afforded by splanchnic section

Contemporaneously with the early work in this clinical field one of us (SJGN<sup>33</sup>) approached the rationale of partial sympathetic exclusion in dogs with denervated carotid-sinuses and sectioned aortic-depressor nerves. It was demonstrated in 1934 that bilateral splanchnic-nerve section combined with bilateral abdominal ganglionectomy failed to reduce the arterial hypertension produced by this means. In the same year Bacq, Brouha and Heymans<sup>39</sup> showed that total sympathectomy in dogs prevented the development of acute hypertension of carotid-sinus, aortic-depressor-nerve origin.

These investigations have been extended and permit further analysis. The results may be best illustrated in Dog 11 of our series (Fig 2). This

first sacral) also caused a temporary fall in pressure to 155 mm., with return to its former high level of 205 mm. after two months.

Right thoracic ganglionectomy (stellate ganglion to the eighth dorsal ganglion) two and a half months after the latter procedure caused only a slight fall in pressure (205 to 185 mm.), with a subsequent rise to 225 mm.

This dog died spontaneously five and a half months later, after three years of hypertension, with a final pressure of 205 mm.

The ineffectiveness of bilateral splanchnic-nerve section in reducing this type of hypertension was demonstrated in two other dogs. One of these (Dog 14) with an oscillating type of hypertension showed a more lasting fall in blood pressure from 200 to 156 mm for five months, with subsequent return to levels as high as 245 mm (Fig 3). In the third dog (Dog 7), bilateral splanchnic-nerve section combined with removal of the right abdominal sympathetic chain caused the blood pressure to drop temporarily from 220 to 158 mm. Two weeks later it returned to 190 mm. Nine months later it reached 235 mm (Fig 4).

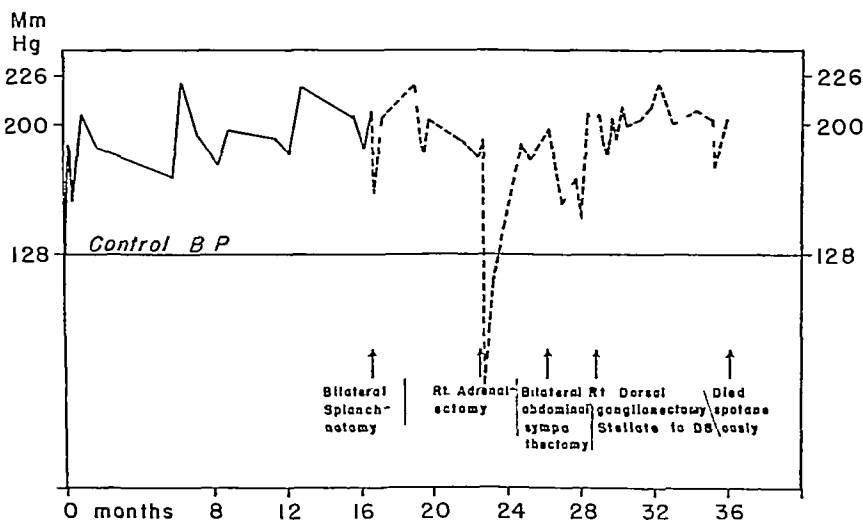


Figure 2 Effect of Sympathectomies on Blood Pressure in Chronic Hypertension Produced by Carotid-Sinus and Aortic Depressor Denervation (Dog 11)

dog showed a persistent elevation of blood pressure varying between 180 and 226 mm of mercury for seventeen months after carotid-sinus and aortic-depressor-nerve exclusion. Operative procedures on the sympathetic system showed the following effects on blood pressure.

Bilateral splanchnic section caused a drop in pressure from 205 to 170 mm of mercury which lasted only two weeks, when the pressure regained its former level, it subsequently rose to an even higher point.

Extirpation of the right adrenal gland six months later produced a marked but also temporary fall in blood pressure to 60 mm of mercury, with return to its former level of 190 mm. two months later.

Bilateral abdominal sympathectomy (first lumbar to

Heymans<sup>40</sup> showed that total sympathectomy carried out in three stages in a dog with previously denervated carotid-sinus and aortic-depressor regions and with resulting hypertension reduced the blood pressure to normal. He observed that the blood pressure still remained at its hypertensive level after three-fourths sympathectomy. This finding is in agreement with our observations on the first dog discussed, which showed a tension of 205 mm after two-thirds sympathectomy.

By reversing the procedure followed by Heymans we have demonstrated that preliminary total

sympathectomy fails to neutralize experimental chronic hypertension of carotid-sinus and aortic-depressor-nerve origin. Dog 30 was totally sympathetomized in two stages, the entire thoraco-abdominal chain being removed intact in each

fourths sympathectomy fails to affect this hypertension. Finally, the mechanism underlying this hypertension is still able to exert a moderate but definite hypertensive effect in spite of total sympathectomy. Whether, in the latter case, this increment in pressure is due to the liberation of some intrinsic factor or to the development of vasoconstriction by some unknown mechanism cannot be answered as yet. It is definitely not due to any organic change such as arteriosclerosis.

From these data one is obliged to draw the conclusion that there is little if any rationale for splanchnotomy and rhizotomy in clinical essential hypertension.

EFFECT OF VARIOUS SYMPATHETIC PROCEDURES ON  
EXPERIMENTAL HYPERTENSION PRODUCED  
BY RENAL ISCHEMIA

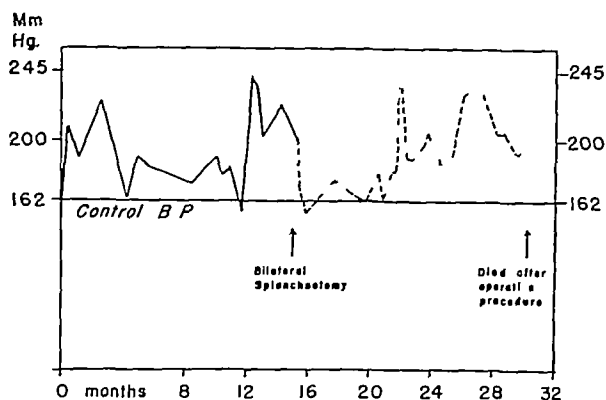


Figure 3 Effect of Sympathectomies on Blood Pressure in Chronic Hypertension Produced by Carotid-Sinus and Aortic Depressor Denervation (Dog 14)

stage, thus eliminating any known sympathetic activity. The control blood pressure was 116 mm. One and a half months after total sympathectomy the carotid-sinuses were denervated and the aortic-depressor nerves sectioned. This procedure was

The effect of partial and total sympathectomy on the nephroschemic hypertension is, as one would expect, completely negative. In this type of hypertension the underlying mechanism is a vasoconstrictor substance liberated by an ischemic kidney which acts on the peripheral vascular musculature. In the presence of this intrinsic stimulus the blood vessels obviously cannot respond to a neurogenic vasodilator mechanism.

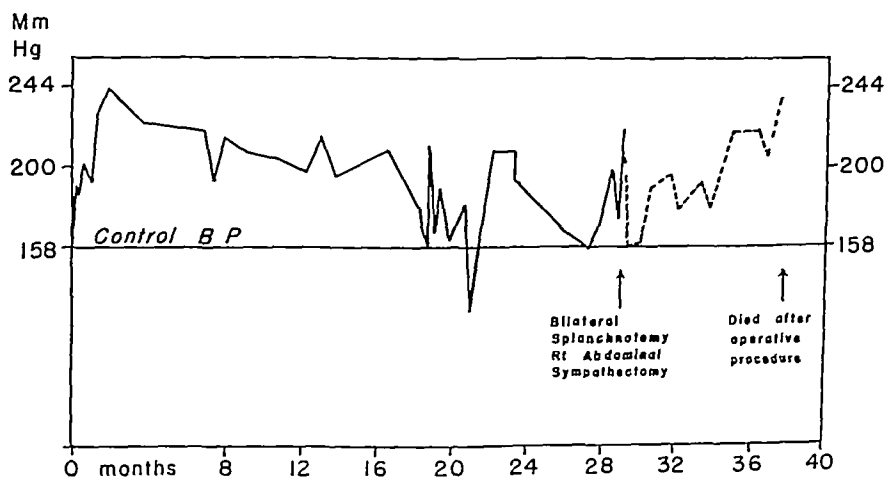


Figure 4 Effect of Sympathectomies on Blood Pressure in Chronic Hypertension Produced by Carotid-Sinus and Aortic Depressor Denervation (Dog 7)

followed by a definite and sustained elevation of blood pressure to 170 mm. The dog died spontaneously two and a half months after denervation, with a blood pressure of 160 mm (Fig 5).

Thus bilateral splanchnotomy fails to reduce, except temporarily, a type of experimental hypertension which is preponderantly, if not purely, vasomotor in origin. In fact, two thirds to three-

These views are based on the demonstration by Page<sup>41</sup> that denervation of the kidneys does not alter the course of nephroschemic hypertension. Goldblatt<sup>42</sup> showed further that bilateral splanchnotomy is likewise ineffective. In fact, total sympathectomy has failed to affect this hypertension, as shown by Freeman and Page<sup>43</sup> and Heymans et al.<sup>44</sup>

# EFFECT OF NEPHRECTOMY IN HYPERTENSION DUE TO UNILATERAL ISCHEMIA AND PYELONEPHRITIS

The successful results of nephrectomy in unilateral pyelonephritis as reported by Butler<sup>15</sup> and others is in keeping with the results of Goldblatt<sup>28</sup> and others who have abolished hypertension of unilateral renal ischemic origin by removal of the

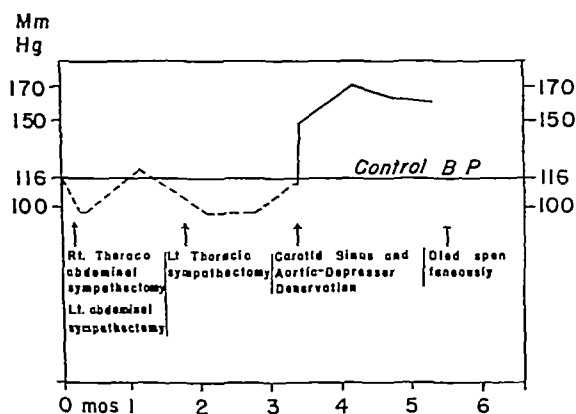


Figure 5 Effect of Carotid-Sinus and Aortic-Depressor Denervation on the Blood Pressure in a Totally Sympathectomized Dog (Dog 30)

ischemic kidney. This important observation should stimulate clinicians to make a careful search for the possibility of unilateral renal disease in hypertensive patients and to give serious consideration to nephrectomy.

## SUMMARY

Various experimental methods which produce hypertension are discussed.

Corroboration of carotid-sinus denervation and aortic-depressor-nerve section as a means of producing experimental hypertension through increased vasomotor activity is presented.

The production of chronic hypertension by chronic cerebral anemia as an original demonstration is presented.

The nature of experimental hypertension due to renal ischemia is discussed in the light of recent investigations.

Partial sympathectomy, including bilateral splanchnotomy, unilateral adrenalectomy, bilateral lumbar ganglionectomy and even two-thirds to three-fourths sympathectomy, fails to reduce hypertension of carotid sinus and aortic-depressor-nerve origin.

Preliminary total sympathectomy does not prevent the establishment of moderate hypertension of carotid sinus and aortic-depressor nerve origin.

These results in an experimental form of hyper-

tension identical with clinical essential hypertension indicate that bilateral splanchnotomy and ventral rhizotomy lack rational grounds for their use in essential hypertension.

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sympathectomy fails to neutralize experimental chronic hypertension of carotid-sinus and aortic-depressor-nerve origin. Dog 30 was totally sympathectomized in two stages, the entire thoraco-abdominal chain being removed intact in each

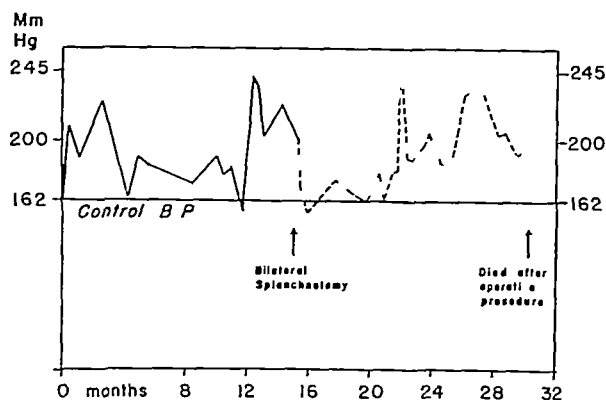


Figure 3 Effect of Sympathectomies on Blood Pressure in Chronic Hypertension Produced by Carotid-Sinus and Aortic Depressor Denervation (Dog 14)

stage, thus eliminating any known sympathetic activity. The control blood pressure was 116 mm. One and a half months after total sympathectomy the carotid-sinuses were denervated and the aortic-depressor nerves sectioned. This procedure was

fourths sympathectomy fails to affect this hypertension. Finally, the mechanism underlying this hypertension is still able to exert a moderate but definite hypertensive effect in spite of total sympathectomy. Whether, in the latter case, this increment in pressure is due to the liberation of some intrinsic factor or to the development of vasoconstriction by some unknown mechanism cannot be answered as yet. It is definitely not due to any organic change such as arteriosclerosis.

From these data one is obliged to draw the conclusion that there is little if any rationale for splanchnotomy and rhizotomy in clinical essential hypertension.

#### EFFECT OF VARIOUS SYMPATHETIC PROCEDURES ON EXPERIMENTAL HYPERTENSION PRODUCED BY RENAL ISCHEMIA

The effect of partial and total sympathectomy on the nephroischemic hypertension is, as one would expect, completely negative. In this type of hypertension the underlying mechanism is a vasoconstrictor substance liberated by an ischemic kidney which acts on the peripheral vascular musculature. In the presence of this intrinsic stimulus the blood vessels obviously cannot respond to a neurogenic vasodilator mechanism.

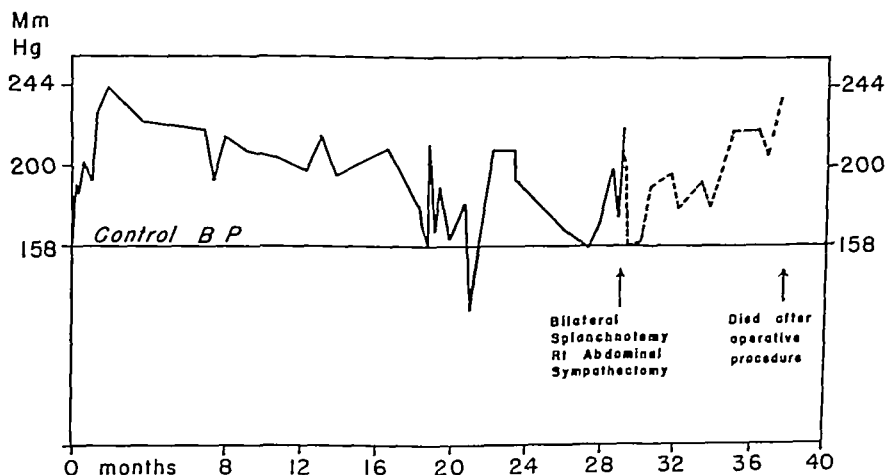


Figure 4 Effect of Sympathectomies on Blood Pressure in Chronic Hypertension Produced by Carotid-Sinus and Aortic Depressor Denervation (Dog 7)

followed by a definite and sustained elevation of blood pressure to 170 mm. The dog died spontaneously two and a half months after denervation, with a blood pressure of 160 mm (Fig 5).

Thus bilateral splanchnotomy fails to reduce, except temporarily, a type of experimental hypertension which is preponderantly, if not purely, vasomotor in origin. In fact, two thirds to three

These views are based on the demonstration by Page<sup>11</sup> that denervation of the kidneys does not alter the course of nephroischemic hypertension. Goldblatt<sup>12</sup> showed further that bilateral splanchnotomy is likewise ineffective. In fact, total sympathectomy has failed to affect this hypertension, as shown by Freeman and Page<sup>12</sup> and Heymans et al.<sup>11</sup>

using preserved dissection-room cadavers have usually described the plexus as a conglomerate nerve without separation and without anastomosing fibers. Experimentally, on animals, and by stimulation during operation on human beings, it has been shown that the thoracolumbar nerves supply the region of the trigone more exclusively with fibers

to the hypogastric (pelvic) ganglia. As they emerge from these, the fibers can be divided again into three groups, the upper root supplying the fundus of the bladder, the middle root supplying the mid-portion of the bladder, and the lower root going to the lower aspect of the bladder, the vesical neck and the adjacent urethra.

Table 1 *Reported Cases of Tuberculosis of the Bladder Treated by Sympathetic Surgery*

CASE NO.	AUTHOR	REMARKS	OPERATION	RESULTS
1	Learmonth <sup>7</sup>	Age 33	Presacral neurectomy	Marked relief of pain only slight frequency
2	Learmonth <sup>14</sup>	Age 45 tuberculosis of genitourinary tract for 5 years.	Cutting of efferent branches of hypogastric ganglia and presacral neurectomy	Died postoperatively
3		Age 38 tuberculosis for 6 years nephrectomy	Presacral neurectomy	Condition good 6 months then return of symptoms.
4	Learmonth and Braasch <sup>12</sup>	Age 35 (woman) 5 years of urinary frequency and severe pain.	Presacral neurectomy	Disappearance of pain persistence of frequency
5	Robert <sup>4</sup>	Unilateral crisis type of pain	Periureteral sympathectomy (unilateral)	Relieved unilateral crises until death in 4 months
6		Pain originating from ureteral stump	Periureteral sympathectomy (unilateral)	Lived 2 years relief.
7		Bilateral type of crisis pain	Periureteral sympathectomy (bilateral)	Complete relief
8	Van Dillen <sup>12</sup>	Genitourinary tuberculosis	Presacral neurectomy	Persistent pain and incontinence
9	Pertin <sup>16</sup>	Severe dysuria	Presacral neurectomy	Immediate amelioration of frequency died 3 months postoperatively
10		Severe pain and frequency	Presacral neurectomy	No pain died 15 days postoperatively
11		Frequency to point of incontinence; severe dysuria.	Presacral neurectomy	Amelioration of frequency
12	Pieri <sup>15</sup>	Age 40 nephrectomy for tuberculosis	Presacral and hypogastric neurectomy	Some relief of pain for 4 years
13		Age 16 severe pain and frequency	Presacral neurectomy; division of sympathetic chain and rami communicantes.	Excellent relief of pain 2 years until death
14		Age 36 tuberculosis of lungs and urinary tract pain and frequency	Presacral neurectomy; division of sympathetic chain and rami communicantes	Died in 4 days of uremia apparent relief of pain
15	Reynard and Mahon <sup>18</sup>	Operated on five times for tuberculosis of urinary tract	Presacral and hypogastric neurectomy	Relief only after resection of ulcer in bladder
16	van Suermondt Leiden <sup>17</sup>	No history	Presacral neurectomy	Less frequency
17		No history	Presacral neurectomy	Less frequency
18		No history	Presacral neurectomy	Less frequency
19	Kwan, Char and Tung <sup>13</sup>	Severe pain and frequency	Presacral neurectomy	Symptomatic improvement
20	von Nozsky <sup>19</sup>	Bladder pain, frequency and diminished capacity	Presacral neurectomy	Some pain remained tenesmus diminished capacity increased
21		Bladder pain, frequency and diminished capacity	Presacral neurectomy	Favorable
22		Bladder pain, frequency and diminished capacity	Presacral neurectomy	Favorable
23		Bladder pain, frequency and diminished capacity	Presacral neurectomy	Favorable
24		Bladder pain, frequency and diminished capacity	Presacral neurectomy	Favorable
25		Bladder pain, frequency and diminished capacity	Presacral neurectomy	Unfavorable

than they do the remainder of the bladder, a point which may be important in the selection of operative cases when considering all types of bladder pain.

The parasympathetic fibers (craniosacral outflow) from the anterior primary divisions of the second, third and fourth sacral nerves are divided into three so-called pelvic nerves and course

The physiology of the nerves supplying the bladder is the subject of considerable controversy at the present time, from the point of view both of clinical observation and of animal experimentation. Learmonth and Braasch<sup>3</sup> found that by arranging cystoscopic examinations at the time of operation stimulation of the sympathetic nerves brought about closure of the ureterovesical orifices con-

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## PELVIC SYMPATHETIC SURGERY FOR THE RELIEF OF BLADDER PAIN\*

### Resection of the Superior Hypogastric Plexus and Lateral Sacral Sympathetic Ganglia in Tuberculous Cystitis

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THE purpose of this paper is to give a brief outline of the treatment of intractable pain of tuberculous cystitis by sympathetic denervation of the pelvis. A brief résumé of the history, anatomy and physiology of the nerves involved will be presented in order to give the chronological background.

The superior hypogastric nerve plexus of the pelvis was first described by Winslow<sup>1</sup> in 1732, and has been redescribed and renamed many times since. Jaboulay<sup>2</sup> in 1899 first directed attention toward relief of pain by surgery of the pelvic sympathetic nerves. He used a retrorectal approach which probably destroyed the nerve pathways to or from the hypogastric ganglia, resulting in urinary incontinence, and the operation did not meet with approval. Latarjet<sup>3</sup> in 1913 first adequately described the pelvic sympathetic nerves, but erroneously named the superior hypogastric plexus the "presacral nerve." In 1921 Rochet,<sup>4</sup> attempting to relieve pain in tuberculous cystitis, used periureteral sympathectomies on 3 patients with some relief, but all had an associated incontinence of urine, as did Jaboulay's operated patients, and probably for the same reason. Cotte<sup>5</sup> first performed the operation known as presacral neurectomy in 1925, and has since popularized it with the medical profession, especially gynecologists. Pieri<sup>6</sup> in 1926 attempted to relieve the pain of incurable tuberculous cystitis by the use of Cotte's operation (excision of the superior hypogastric plexus), but was only partially successful. He then did a more radical neurectomy by incising the lateral sacral chains at the level of the first sacral

segment, and also cut the rami communicantes to the sacral chain, with better results. In 1932 Learmonth<sup>7</sup> applied Cotte's operation to neurogenic imbalance of the bladder.

Anatomically the nerve supply of the bladder has two subdivisions, the somatic and the autonomic. The latter is composed of the sympathetic and the parasympathetic systems. The somatic nerves take their origin from the anterior division of the third and fourth sacral nerve roots, and carry both motor and sensory fibers to the bladder and posterior urethra. The sympathetic nerves are derived from the thoracolumbar system. Their origin is spread over a large area of the cord, that is, from the celiac, renal and mesenteric abdominovisceral ganglia, as well as from the first four lateral lumbar sympathetic chain ganglia. All these fibers are bottle-necked in the region of the last lumbar vertebral body as the superior hypogastric plexus (presacral nerve). This anatomical peculiarity makes the fibers easily amenable to surgery, even though their origin is so widespread segmentally over the cord. The superior hypogastric plexus divides into two more or less distinct nerve groups, that is, the right and left hypogastric nerves, which carry the thoracolumbar sympathetic fibers to the hypogastric (pelvic) ganglia and hence to the bladder. The superior hypogastric plexus and hypogastric nerves during their course receive branches from other sources from the last lumbar sympathetic ganglia, from the plexus surrounding the inferior mesenteric vessels, and their continuation, and from the superior hemorrhoidal nerve. They also receive fine filaments from the sacral chain, as shown by our own dissections on fresh cadavers and examinations of living tissue at the time of operation. Anatomists

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moved before the posterior peritoneum is closed. The abdomen is closed without drainage.

#### CASE REPORTS

**Case 1** M. D., a 12-year-old girl, gave a 6-year history of urinary tuberculosis, confirmed by guinea pig inoculation. There was voiding every half hour, with incontinence at night. The bladder capacity was 80 cc. Excision of the superior hypogastric plexus and lateral sacral chains was performed July 3, 1934. The bladder capacity

the bladder capacity increased to 290 cc. and continued at 300 cc.

**Case 4** R. B., a 42-year-old man, had a 24 year history of bone and joint tuberculosis, with a diagnosis of genitourinary tuberculosis 7 years previously. The patient had voided every 15 minutes with severe pain for the last 2 months. Guinea pig inoculations were positive. Resection of the superior hypogastric plexus and lateral sacral chains was done in November, 1934. There was no further pain, the patient voided every 2½ or 3 hours, with a bladder capacity of 175 cc.

**Case 5** A. B., a 48-year-old man, 4 years previous to examination had had painful and frequent urination, 10 months previously hematuria had developed, followed by bilateral tuberculous epididymitis and increased bladder symptoms, so that he voided every 15 minutes, with a bladder capacity of 100 cc. A diagnosis of renal tuberculosis was made and was confirmed by guinea pig inoculation. Excision of the superior hypogastric plexus and the lateral sacral chains was followed by a rise in bladder capacity to 275 cc., with frequency decreased to every 2 or 3 hours.

**Case 6** A. G., a 26-year-old woman, underwent a nephrectomy for tuberculosis in February, 1934, with no relief of bladder symptoms. Frequency and dysuria persisted in spite of hysterectomy for fibroids. There was voiding every 5 to 15 minutes. Excision of the superior hypogastric plexus and left lateral sacral chain was done in December, 1935. The bladder capacity rose to 300 cc., but the same pain persisted and there were periods during which the frequency recurred. Intrathecal alcohol was injected in April, 1936. This was followed by complete relief of pain and of frequency. The patient now voids every 3 to 4 hours during the day and twice each night.

**Case 7** R. M., a 32-year-old woman, underwent a nephrectomy for tuberculosis in 1930, with some relief of bladder symptoms for 6 years. This was followed by recurrence, the symptoms becoming unbearable. Tuberculosis was found in the remaining kidney. There was voiding every 15 or 20 minutes, with pain referred to the urethra. Excision of the superior hypogastric plexus and the lateral sacral chains was done in September, 1937, with relief of pain except that referred to the urethra. Injection of intrathecal alcohol in February, 1936, was followed by complete relief. The bladder capacity increased to 400 cc., and frequency decreased to every 3 or 4 hours.

#### COMMENT

We have delayed reporting this series of cases until the results seemed relatively permanent. Relief of frequency following pelvic sympathectomy is at times greater than the increased bladder capacity, showing decreased bladder irritability, as well as relief of pain. Healing of the bladder lesions following operation may be coincident with the increased blood supply and tissue nutrition associated with postoperative vasodilatation. Relief of pain has been uniformly successful, especially where lesions are confined to the trigone. (Tuberculous bladder lesions are most frequently found about the ureteral orifices and trigone.) It has been noted in our cases of bladder pain due to other conditions than tuberculosis that results are

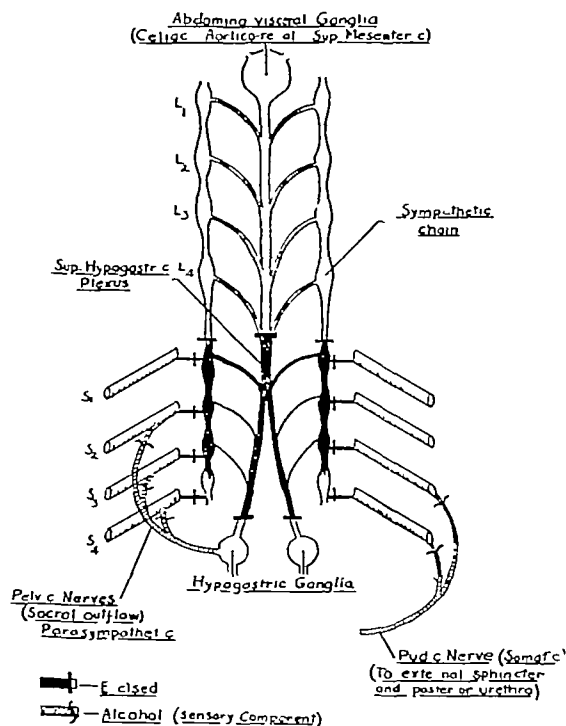


Figure 1. Excision of Superior Hypogastric Plexus, Excision of Sacral Sympathetic Chains and Intrathecal Alcohol Injection.

increased to 180 cc., with no pain or incontinence. There was voiding every 2 hours. The patient was able to attend school for the first time in 6 years.

**Case 2** A. F., a 26-year-old man, gave a 3-year history of symptoms of genitourinary tuberculosis. There were bilateral destructive lesions of the kidneys. A guinea pig inoculation of urine from the bladder was positive. The bladder capacity was 90 cc., and there was voiding every half hour. Resection of the superior hypogastric plexus and right lateral sacral chain was done in October, 1934. Relief of pain followed and frequency ceased. The bladder capacity was increased to 175 cc., without pain, and the patient was able to work as an apprentice printer.

**Case 3** J. C., an 18-year-old girl, gave a long history of bone and joint tuberculosis. There was a 15 month history of severe dysuria and frequency, during which the patient had led a "catheter life" in a sanatorium. Cystoscopy with pyelograms and guinea pig inoculation revealed bilateral tuberculosis. Resection of the superior hypogastric plexus and lateral sacral chains was performed in November, 1934. There was complete relief of pain.

traction of the trigone, closure of the internal sphincter, contraction of the prostate, seminal vesicles and ducts, inhibition of the expulsive power of the bladder, and that they carried afferent fibers for sensation of pain in the bladder." Recent work by other observers, especially McCrae and Macdonald,<sup>9</sup> raises doubt whether either system is exclusively excitator or inhibitor in function or whether they are antagonistic, but suggests that they do work together, along with the somatic nerves, in the regulation of bladder function. The parasympathetic fibers are apparently the most important and carry the stronger impulses.

With the reports of cases operated on for the relief of bladder pain in tuberculous cystitis, as summarized in Table 1, and with the foregoing anatomical facts and physiological observations in mind, we attempted to improve the results, and planned a more radical sympathectomy than Cotte's presacral resection and Pieri's addition of section of the sacral chains and rami communicantes. To accomplish this, we excised the superior hypogastric plexus, as did Cotte, sectioned the lateral sacral chains, as did Pieri, and then performed an exeresis of these lateral sacral chains. Just as the operation of phrenico-exeresis as proposed by Felix<sup>10</sup> causes a more marked and permanent paralysis of the diaphragm, so this operation results in a more marked and permanent relief of pain in the bladder. We still leave intact, however, the parasympathetic fibers, as well as the pudendal somatic supply. In order to remove the sensory fibers of both these groups, and not the motor fibers, which has always been done with nerve resections resulting in incontinence (Jaboulay<sup>2</sup> and Rochet<sup>4</sup>), we have added, when necessary, the postoperative use of intrathecal alcohol, with exacting control of the subarachnoid dispersion of the alcohol, the injection results in no motor paralysis, but does give complete relief of pain.

It has previously been pointed out that fibers which comprise the superior hypogastric plexus are diffused over a large area of the cord, and are therefore not well adapted to treatment with intrathecal alcohol, yet they are readily accessible to the surgeon, since anatomically they are converged in a small, easily accessible space.

Intrathecal alcohol therapy though simple is not without danger, and numerous accidents and sequelae have been recorded, it should be used only as a last resort. Its greatest danger is its relative simplicity. A spinal tap is carried out as low down as possible, with the patient in the lateral prone position. The hips are then elevated on firm pillows, or, better, by lowering the head end of the

flat supporting surface, and the torso is rotated anteriorly into an oblique position, since only the most caudal sensory (posterior) nerve components are to be primarily affected. One half to 1 cc of absolute alcohol is slowly injected. The needle is removed, and the patient is kept in this exaggerated position for three hours and in a prone position for three more. A lapse of one or two weeks is allowed between injections, that is, before intrathecal alcohol is again used, with the opposite side uppermost.

The technic of simple excision of the superior hypogastric plexus has been frequently given in the literature and will not be repeated here, except to state that it must be complete. It is a good rule to consider in surgery that in all cases the group consists of a plexus rather than a nerve, so that the smallest fiber is not overlooked and left undivided at operation. The technic of resection of the lateral sacral chains is not difficult and can be approached through the same incisions. A lower abdominal midline incision is carried out and the peritoneum opened. The entire bowel except the lower sigmoid is pushed into the upper abdomen, so that the inverted V made by the branches of the common iliac vessels is in view. Identification of the contents of the mesentery of the sigmoid is important, both for nerve fibers to and from the superior hypogastric plexus, and to avoid injury to the inferior mesenteric vessels. The posterior peritoneum is opened longitudinally in the mid-line over the bifurcation of the great vessels for a distance of 7 to 10 cm down into the concavity of the sacrum. The superior hypogastric plexus is identified and dissected well down, so that the hypogastric nerves are exposed, and all fibers leading to and from the group are disrupted, dissection being aided with nerve hooks. The nerve group is next excised, and the cut ends are tied or silver-clipped. The posterior peritoneal flaps are dissected further laterally to a point just lateral to the anterior sacral foramina. The latter are important landmarks, since the sacral sympathetic chains run just medial to the foramina and can be easily felt and "snapped" between the finger and sacrum, as is the vas deferens between the fingers and thumb. The chain is then incised above the first sacral segment, and the distal cut end is grasped with a clamp, which is twisted, curling the nerve chain over its end, at the same time the chain is pulled out. With a blunt dissector the chain is freed simultaneously of all its connections so that it can be pulled out more readily. Two or three ganglia are obtained and bleeding is scant, being easily controlled with packs, which are re



cause of death in diabetes from coma to arteriosclerosis. Of 342 deaths reported during the Naunyn era, from 1894 to 1914, 15 per cent were caused by arteriosclerosis in some form and 61 per cent by coma. Of 805 deaths reported during the Allen era, from 1914 to 1922, 26 per cent were attributed to arteriosclerosis and 42 per cent to coma. Since the discovery of insulin in 1922 (Banting era), of the 979 deaths recorded up to 1929, 44 per cent came from arteriosclerosis and 17 per cent from coma, of a total of 474 deaths from 1926 to 1929, 48 per cent were traceable to arteriosclerosis and only 11 per cent to coma.

Table 1 *Percentages of Deaths in Diabetes Due to Arteriosclerosis and to Diabetic Coma in Each of the Important Eras of Treatment*<sup>7</sup>

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metric tracings were taken and cutaneous histamine reactions observed in all suspected cases. The scheme adopted for the study of each case was as follows:

- 1 Name and age
- 2 Eyes
  - a Intraocular inflammation
  - b Cataract
  - c Eye muscles
  - d Fundi, especially retinal vessels
- 3 Duration of diabetes
  - a History
  - b Length of time in clinic
- 4 Blood pressure
- 5 Blood sugar
- 6 Blood cholesterol
- 7 Dorsalis pedis pulsation
  - a Right
  - b Left
- 8 Posterior tibial pulsation
  - a Right
  - b Left
- 9 X-ray study of lower extremities for evidence of arterial calcification
- 10 Oscillometric tracing on all cases showing either calcification by roentgenography or poor peripheral circulation by palpation, or both
- 11 Histamine cutaneous test in all cases showing pathologic changes in lower extremities

An analysis of this study, taking the group of cases as a whole, reveals a 38 per cent incidence of arteriosclerosis. However, when the cases are classed by decades of life one readily notes an increase in the incidence with each decade (Table 2). There are no cases in the first and second decades

entire group gave a systolic pressure reading higher than 150, and, interestingly enough, in no patient under thirty was the blood pressure above normal. However, 11 (28 per cent) of those showing evidence of sclerosis had hypertension.

Does an abnormal blood sugar forecast the early development of arteriosclerosis? In the opinion of Mosenthal,<sup>25</sup> hyperglycemia is in no way a causative factor, and this is confirmed by our study. Ninety-two per cent of the group gave blood-sugar readings greater than 120 mg per cent (the accepted normal), while of the patients with arteriosclerosis only 32 (85 per cent) had blood-sugar values higher than 120 mg.

Some observers<sup>11</sup> have stated that there is distinct relation between blood lipids and arteriosclerosis. The cholesterol studies in this group do not warrant such a conclusion. Only 23 per cent of the total cases, and only 8 (21 per cent) of the arteriosclerotic cases, gave readings higher than 225 mg per cent (the accepted normal). The discrepancy between the conclusions of other observers and the findings in this group may be attributed to our use of insulin, and to the change from a high-fat, low-carbohydrate diet to a low fat and high-carbohydrate one. Insulin seems to exert a stabilizing effect on fat metabolism. The cholesterol values have not been nearly so high since the use of insulin and of diets approaching normal.

Deposition of calcium in the vessel walls indicates vascular disease. Roentgenologically this

Table 2 Clinical and Laboratory Findings in Entire Group, Arranged by Decades

Decade	No of Cases	Duration of Diabetes		Blood Pressure			Blood Sugar			Blood Cholesterol			Evidence of Arteriosclerosis	
		Average	Range	High	Low	Average	High	Low	Average	High	Low	Average	No	Percent
		yr	yr	mm	mm	mm	mg	mg	mg	mg	mg	mg		
First	1	7		75/40			182			187				
Second	16	4.0	½ to 7	134/80	82/50	107/63	480	190	300.7	280	157	229.1	1	8
Third	12	5.7	½ to 14½	130/85	110/70	116/73	400	80	238	272	100	181.5	2	17
Fourth	12	5.5	½ to 12	180/105	100/80	119/79	334	112	203.7	286	94	206.25	6	43
Fifth	14	4.8	½ to 11	190/98	110/65	134/77	298	89	163.5	240	130	195	11	48
Sixth	23	3.4	½ to 12	200/120	110/70	142/83	364	121	190.5	300	133	197	13	77
Seventh	17	4	½ to 17	220/80	130/80	153/84	236	82	168	300	164	203.6	5	100
Eighth	5	9	5 to 14	180/108	100/80	164/79	200	115	152.4	200	182	194		

In the third decade the incidence is 8 per cent, in the fourth 17 per cent, and so on until we reach the ninth decade, where the incidence is 100 per cent. It would be irrational to consider diabetes the sole offender in this climbing incidence. Undoubtedly a considerable portion of vascular disease can be and should be attributed to normal degenerative changes relevant to age.

The question of hypertension in diabetes and its relation to arteriosclerosis is also of interest. Are the two parallel? Only 18 per cent of this

can be demonstrated very adequately. X-ray studies of the lower extremities were made on all our patients. Twenty-four per cent of the entire group showed evidence of sclerosis as compared with 63 per cent in the arteriosclerotic group (Table 3). However, advanced sclerosis may exist without one's being able to demonstrate such deposition roentgenologically, as evidenced by the 14 cases with negative x-ray findings but with other indications of vascular damage.

The pulsations of the dorsalis pedis and pos-

terior tibial arteries are important objectives when searching for information regarding the circulation in the lower extremities. A good dorsalis pedis pulse was observed in 25 (66 per cent) of the arteriosclerotic group, the pulse was diminished in 6 cases and absent in 7. A good posterior tibial pulse was noted in 11 cases (29 per cent), the pulse was diminished in 6 cases and absent in 21. Does a good pulse rule out arteriosclerosis? Obviously not. Sixteen (66 per cent) of the 24 cases showing calcium deposition in the vessel walls by x-ray had either a good dorsalis pedis pulse or a good posterior tibial pulse, or both. Again, curiously enough, in 3 cases with no pulsation the roentgen-ray findings were negative.

In the study of the eyes no incidence of intraocular inflammation was noted and in only 1 patient was muscular abnormality found. The case report follows.

H.D., 46 years old, had had diabetes for 3 years. The blood pressure was 130/80, the blood sugar 118 mg per cent and the blood cholesterol 200 mg per cent. No

in the eighth. Twenty-three per cent of the entire group, or 60 per cent of the arteriosclerotic group, had retinal lesions. 1 in the third decade, 4 in the fifth, 6 in the sixth, 9 in the seventh and 5 in the eighth. Here, too, one is at a loss as to how much to blame the diabetes and how much the advancing age. Only 4 of the patients under fifty showed retinal changes, as compared with 19 of those aged fifty and over. These findings compare favorably with those of Spalding and Curtis,<sup>28</sup> who found a 20 per cent incidence of arteriosclerosis on ophthalmoscopic examination of the eye grounds.

The arteriosclerotic group was studied for possible detection of deficient circulation of the lower extremities with the oscillometer and the histamine intracutaneous test. The Pachon recording oscillometer was employed, and the readings at the ankle joint were recorded at various pressure levels. The height of the oscillations was used in grading the degree of efficiency of the circulation. With an oscillation of 5 mm or over the circulation was

Table 3 Findings in the Arteriosclerotic Group Arranged by Decades

Decade	No of Cases	Average Blood Pressure	Average Blood Sugar	Average Blood Cholesterol	X Ray Findings	Pulsations		Eyes		Oscillometer Reading	Histamine Response
		mm	mg %	mg %		Dorsalis Pedis	Posterior Tibial	Fundi	Cataract		
Third	1	120/70	298	160	Positive	3+	2+	Sclerosis		Good	Good
Fourth	2	115/80	280	205	1 Positive 1 Negative	4- 3+	1 4+ 1 3+	2 Normal		1 Good 1 Fair	2 Good
Fifth	6	126/76	198	194	4 Positive 2 Negative	3 4+ 2 3+ 1 2+	2 3+ 2 2+ 2 0	4 Normal 2 Sclerosis	1	5 Good 1 Poor	4 Good 2 Fair
Sixth	11	138/76	177	203	9 Positive 2 Negative	2 4+ 3 3+ 3 2+ 1 1+ 2 0	1 2+ 4 1+ 6, 0	5 Normal 6 Sclerosis		4 Good 2 Fair 4 Poor 1 0	8 Good 1 Fair 2 0
Seventh	13	155/85	157	207	7 Positive 6 Negative	2 4+ 2 3+ 4 2+ 2 1+ 3 0	2, 3+ 1 2+ 2 1+ 8 0	4 Normal 9 Sclerosis	3	4 Good 3 Fair 6 Poor	7 Good 2 Poor 4 Not done
Eighth	5	164/92	152	194	2 Positive 3 Negative	3 1+ 2 0	5 0	5 Sclerosis	1	1 Fair 4 Poor	1 Good 2 Fair 2 Poor
Cases showing evidence of arteriosclerosis	38	13	32	8	24	13	27	23	5	16	6

calcification was shown by x-ray, and both the dorsalis pedis and posterior tibial pulsations were good.

The eye findings were as follows. The pupils are equal, regular and react to light and accommodation. The motility of the right eye is limited in all directions except outward and upward, the greatest limitation being inward. The eyes are prominent and the right fissure is slightly larger than the left. There seems to be a myasthenia of the extraocular muscles, most marked in the right eye and especially in the right internal rectus. There are no retinal changes.

This patient had a unilateral thyroidectomy 3 years prior to this study and his present basal metabolic rate is +34 per cent. He shows no evidence of arteriosclerosis.

Five patients showed evidence of cataract formation. 1 in the fifth decade, 3 in the seventh and 1

considered good or adequate, with 2 to 4 mm. as fair, with 1 mm. as poor, with no response as zero. Fifteen cases (39 per cent) showed normal oscillogram tracings, in 7 (18 per cent) the tracings were considered fair, 15 (39 per cent) gave a poor reading, and in 1 case the reading was zero.

How may one interpret with impunity the low incidence of circulatory impairment and the high incidence of relatively normal readings? Kramer<sup>29</sup> supplies a satisfactory answer when he says, "Since the mechanism of the oscillometer is so arranged as to give us information upon the gross blood flow and the rhythmic expansion and contraction of the vessels, it is only fair to assume that if a

satisfactory collateral circulation has been established we may get normal readings despite the presence of definite disease in some of the vessels." The presence of vascular damage does not necessarily imply that the circulation is not patent.

The histamine intracutaneous test was carried out on 34 of the arteriosclerotic patients. One tenth of one cubic centimeter of a 1:1000 solution was injected intracutaneously and the response was noted at five-, ten- and fifteen-minute intervals. The sites selected were those above and below the knee, above the ankle and on the dorsum of the foot. Normally a flare and a wheal appear at the end of five minutes and usually become more marked at the time of the ten-minute observation. At the end of fifteen minutes, if no local reaction is observed the response is considered negative. In 23 cases (67 per cent) the reaction was normal. Six (17 per cent) showed a delayed response. In 4 (12 per cent) the reaction was minimal and in 2 (6 per cent) it was absent. All the patients except 2 who showed a normal response to histamine had a normal (good) oscillometric tracing. Here again the high incidence of a normal response does not discredit the test. On the contrary, the test gives one information as to the patency of the capillaries and peripheral circulation and indirectly tells one something about the status of the deep and large vessels.

Table 3 summarizes the positive findings in the arteriosclerotic group. It will be observed that by a combination of methods the incidence is 38 per cent. It is also of interest to note that the number of cases which showed hypertension parallels fairly well the numbers which showed positive x-ray findings and retinal arteriosclerosis—18, 24 and 23 per cent respectively. A good pulsation means an efficient circulation, but by no means indicates absence of vascular disease. However, when no pulse is present and in addition one gets a negative oscillometer reading and a poor histamine response, it is safe to assume that vascular lesions are present and that the circulation is impaired. Interestingly enough, the 13 patients with poor or no pulsation of the dorsalis pedis artery compare favorably with the 16 who showed a poor oscillometric index. The histamine response was negative or poor in 6 cases. The pulse of the posterior tibial artery was at least only poorly palpated in 27, in only 8 were the lipid values above normal, while high blood-sugar values were found in 32.

#### CONCLUSIONS

A multiplicity of methods yields a far greater incidence of arteriosclerosis than does any one single method.

The blood-cholesterol values have decreased to a relatively normal level since the advent of insulin and the use of diets containing a high-carbohydrate and low-fat content.

The number of patients having a poor or no pulsation of the peripheral vessels of the lower extremities compares favorably with the number showing a poor oscillometric index.

The histamine intracutaneous response is the most reliable guide in determining the presence or absence of a sufficient collateral circulation.

The ophthalmological examination of the fundi, the x-ray study of the lower extremities and the blood-pressure readings demonstrate a relatively equal incidence of arteriosclerosis.

126 Waterman Street.

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## ALCOHOL TOLERANCE TESTS IN NORMAL INDIVIDUALS AND IN PATIENTS WITH DIABETES MELLITUS AND DIABETES INSIPIDUS\*

## The Effect of Pituitrin, Insulin, Food and Forced Water on Blood and Urine Alcohol Levels After The Ingestion of Alcohol

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ALCOHOL is absorbed with extreme rapidity from the gastrointestinal tract, even though it destroys digestive enzymes<sup>1</sup> and prevents or delays the proper digestion of food<sup>2</sup>. Furthermore, Mellanby<sup>3</sup> and others have shown that the metabolism of alcohol, regardless of the amount present, proceeds at a constant rate for the individual. There are very few conditions which are known to modify the rate of absorption or metabolism of alcohol. For example, insulin has been said by some to increase the rate of disappearance of alcohol from the blood, whereas food was thought to slow the rate of its absorption.

Normal people have a varying tolerance to alcohol, just as they do to tobacco and other drugs. A few patients with diabetes insipidus have told me that they can tolerate liquor better than normal people. Frequently patients with diabetes mellitus ask whether a drink of alcohol would do them harm. To investigate these points appeared to be of practical importance.

This paper presents a study of alcohol tolerance tests in normal and diabetic persons, and of the effect of pituitrin, insulin, food and forced water intake on these tests.

## METHODS

The alcohol tolerance was determined in much the same way that glucose tolerance is ordinarily studied. A dose of 0.6 cc. of absolute alcohol per kilogram of body weight was employed as a test meal. The standard solution contained 50 cc absolute alcohol, 50 cc. grapejuice and 150 cc water. This was a reasonably palatable mixture and never caused vomiting, nausea or diarrhea. It was chilled and administered to the patients in the morning after fasting overnight. The alcohol concentration was determined in simultaneous samples of venous blood and urine which were obtained before the test meal and at half-hour intervals for four hours thereafter. The dose of absolute alcohol usually varied from 40 to 50 cc. The patients remained in the laboratory during the test period without additional food, but with

some added water if desired. The symptoms of intoxication were noted.

The chemical method at first used for the determination of alcohol was that described by Fleming and Stotz.<sup>4</sup> It is a modification of that employed by Nicloux<sup>5</sup> for use of the Folin-Wu blood filtrate, and is based on the principle of the reduction of potassium dichromate in sulfuric acid, with the estimation of the excess by ferrous ammonium sulfate and titration with potassium permanganate. Chiefly because the potassium permanganate solution is unstable, and because to adjust it to proper strength often requires considerable time, the method was modified further in this clinic<sup>6</sup> to determine the concentration of alcohol by the Evelyn photoelectric colorimeter.<sup>7</sup> This measures directly the diminution of the color of the acid bichromate solution due to reduction by alcohol, and eliminates the potassium permanganate and ferrous ammonium sulfate solutions and the titration. The results obtained are accurate and agree with those obtained with the titration method.<sup>6, 8</sup>

The analyses were made on 10 cc. of the Folin-Wu blood filtrate and on 10 cc and 1 cc of the urine obtained before and after alcohol ingestion respectively.

## ALCOHOL TOLERANCE CURVES IN NORMAL PEOPLE

The alcohol tolerance was studied, first, in 10 normal persons in order to obtain a standard with which to compare the tolerances observed in diabetic patients. The average urine and blood values are given in Chart 1. The fasting blood alcohol varied from 0 to 7 mg per cent. After the ingestion of alcohol there was a rise in the curve, which reached its average maximum concentration of 41 mg in one hour and decreased gradually to a level of approximately 15 mg in four hours.

The fasting urine alcohol varied from 0.4 to 2 mg per cent. After the ingestion of alcohol it rose to an average maximum concentration of 50 mg in one and a half hours, and decreased in four hours to an average level of 16 mg. This concentration was appreciably lower than that in the blood at the first half hour, but exceeded it at

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one hour and one and a half hours. Also the blood alcohol, during its period of decline, was slightly lower than the urine alcohol. Smith and Stewart<sup>9</sup> surmised that this relation between blood and urine alcohol was to be expected.

It was interesting to observe that some symptoms of intoxication appeared in these individuals, in spite of the fact that the blood-alcohol concentrations were less than 63 mg per cent. These symptoms included being exhilarated, euphoric, talkative, slightly dizzy and unstable. The findings were in striking contrast to those observed by Selesnick,<sup>10</sup> who noted that the clinical manifestations of intoxication did not appear in alcoholic patients at the Boston City Hospital until the blood

2 patients the tests were repeated two and three times, with similar findings.

The alcohol curves obtained in diabetes insipidus without pituitrin therapy were similar to those observed in normal persons. There was, however, a slightly sharper rise with a slightly greater maximum level and a slightly sharper drop in these alcohol curves than in those of normal persons. Four hours after the alcohol meal the concentrations were approximately the same as normal.

With pituitrin therapy, the first half of the alcohol curve was definitely lower in diabetes insipidus than without this drug (Chart 2). In addition, pituitrin caused the alcohol concentration in the urine to rise less than that in the blood

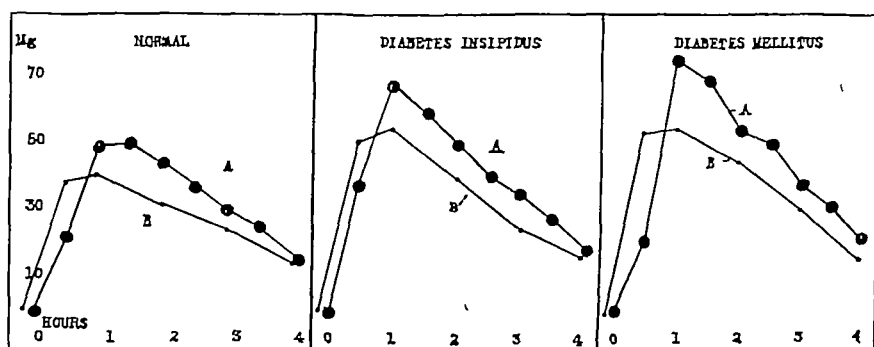


Chart 1 Response to Ingestion of Alcohol

*Average curves for urine (A) and blood (B) alcoholic contents obtained in 10 normal people, 5 with diabetes insipidus and 6 with diabetes mellitus, after the ingestion of 0.6 cc of absolute alcohol per kilogram of body weight. In this and subsequent charts the alcohol is recorded in milligrams per cent.*

alcohol exceeded 200 mg per cent. It is quite likely that this marked difference is due to the fact that Selesnick's patients were chronic alcoholics who could tolerate a much higher blood alcohol level through habituation than could normal persons. On the other hand, Heise<sup>11</sup> found that loss of efficiency and impairment of judgment occurred even when the blood and urine contained as little as 20 mg per cent of alcohol.

#### ALCOHOL TOLERANCE IN DIABETES INSIPIDUS, WITH AND WITHOUT PITUITRIN THERAPY

Alcohol tolerance tests were obtained in 5 patients with diabetes insipidus after pituitrin had been omitted for a few days and the fluid intake and output had been markedly increased (Chart 1). The tests were repeated after the patients had received pituitrin for several days, when the fluid intake and output were normal. The morning of the day of this test, 1 cc of obstetrical pituitrin was administered intranasally on a pledget of cotton immediately after the imbibing of alcohol. In

within half an hour after the alcohol meal, and to a slighter degree within one hour after it. The second half of the curve was much the same as without the administration of pituitrin.

Pituitrin appeared to prevent the usual rise in the alcohol concentration in the blood and urine after the alcohol meal. This may be due to the pituitrin's having inhibited the absorption of alcohol, or to the fact that in uncontrolled diabetes insipidus the alcohol is not metabolized so quickly as in the controlled disease.

It was noted that the blood and urine alcohol levels were higher when the alcohol was taken without pituitrin than with pituitrin. After the administration of pituitrin each specimen of urine usually amounted to only 10 or 20 cc, whereas without pituitrin the volume was as high as 400 cc. This indicates that the kidneys acted as an inert membrane and that the alcohol passed through them into the urine by simple diffusion, as suggested by Ambard,<sup>12</sup> Widmark<sup>13</sup> and others. Con-

sequently the largeness of the volume of urine did not dilute its alcohol content.

It was of unusual significance that the toxic effect of alcohol was more marked and more prolonged with pituitrin therapy, even though the blood and urine alcohol levels were lower. The toxic symptoms increased so much that pituitrin administered with the alcohol put 3 of the patients to sleep, 1 patient, however, showed no special

tests were compared with those of the controls who received no Pitressin or extra water.

The increased water intake produced a slightly greater concentration of alcohol in the blood and urine during the first one and a half hours after the ingestion of alcohol than occurred during the control test (Chart 3). It was interesting that the alcohol concentrations were not diluted, although the volume of urine was increased more than tenfold at times. Miles<sup>14</sup> also found that changes in the amount of urine per minute did not influence significantly the alcohol concentration in the urine. In contrast, Pitressin perceptibly decreased the volume of urine and the alcohol concentration in the blood and urine at two hours after alcohol ingestion as it did in diabetes insipidus. Widmark,<sup>15</sup> on the other hand, found that pituitrin did not alter the blood alcohol curves in dogs.

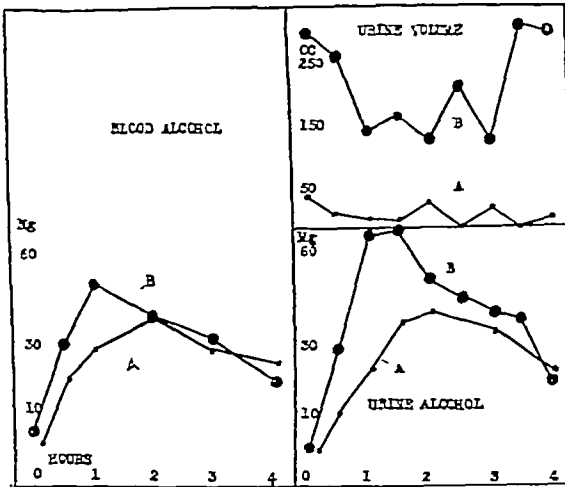


Chart 2. Blood and Urine Findings in a Case of Diabetes Insipidus

Simultaneous curves showing the blood and urine alcoholic contents and the urine volume in a man with diabetes insipidus after the ingestion of 35 cc of absolute alcohol with (A) and without (B) pituitrin therapy.

change. All the patients seemed to experience a more immediate effect of the alcohol without pituitrin.

The interpretation of these results is controversial, as is the whole problem of alcohol tolerance. However, pituitrin possibly caused the retention of a greater amount of alcohol in the tissues, giving intensified alcoholic symptoms. Under such circumstances the blood and urine alcohol might not give a proper indication of the alcohol concentration in those tissues.

#### FORCED WATER INTAKE AND ALCOHOL TOLERANCE

An attempt was made to produce a condition similar to diabetes insipidus in 5 normal persons by having them drink large amounts of water during the test period, so that they voided large volumes of urine. Four or five days later the tests were repeated with 1 cc of Pitressin being given intranasally, when the usual dose of alcohol was ingested and the urine output was small. These

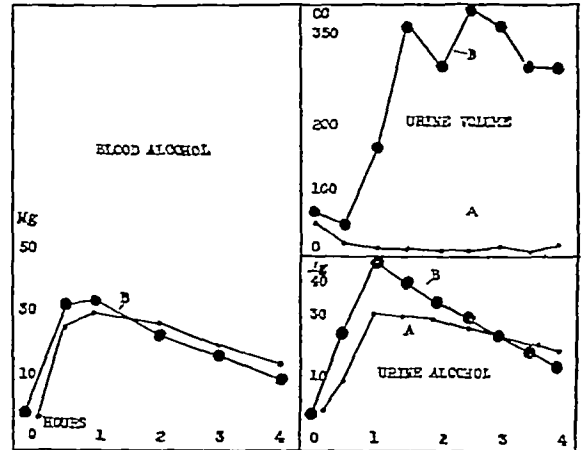


Chart 3. Blood and Urine Findings in a Normal Man

Simultaneous curves showing the blood and urine alcoholic contents and the urine volume in a normal man after the ingestion of 50 cc of absolute alcohol with pituitrin administration (A) on one day and the forcing of water (B) on another.

The alcoholic symptoms appeared a little sooner with the forced water intake than was the case during the control tests, although the duration was about the same. In 2 persons the added water caused slightly fewer toxic symptoms and in 2 individuals slightly more. In 3 normal persons who received Pitressin administered with alcohol, the symptoms were less marked in 1 than during the control test, about the same in 1, and more pronounced in 1.

It appears from the laboratory results that forcing water might be of value in the treatment of alcoholism in increasing the elimination of alcohol, although symptomatically there was no significant change. In terms of milligrams, the amount of alcohol eliminated in the urine in cer-

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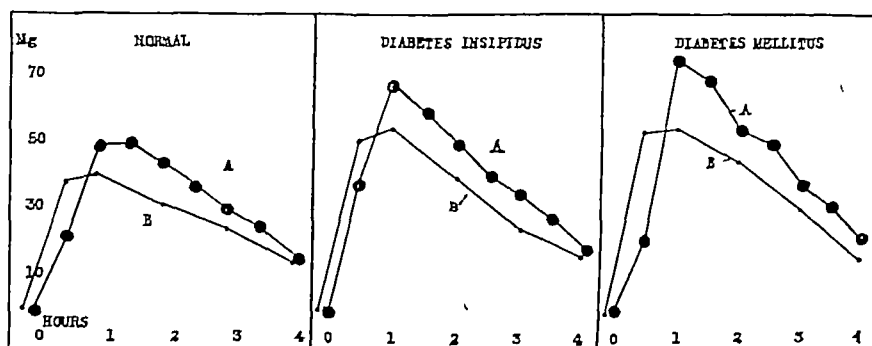


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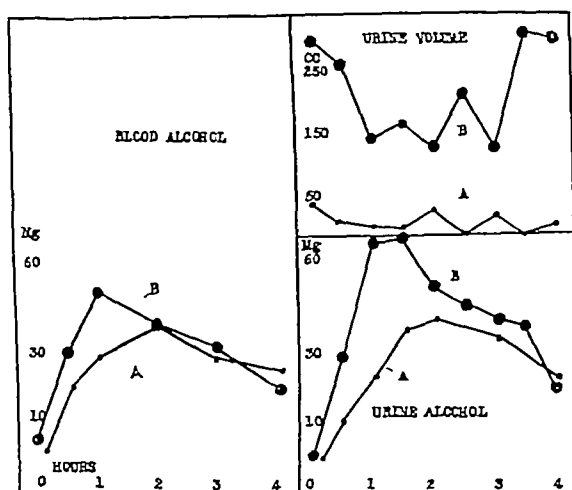


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tests were compared with those of the controls who received no Pitressin or extra water.

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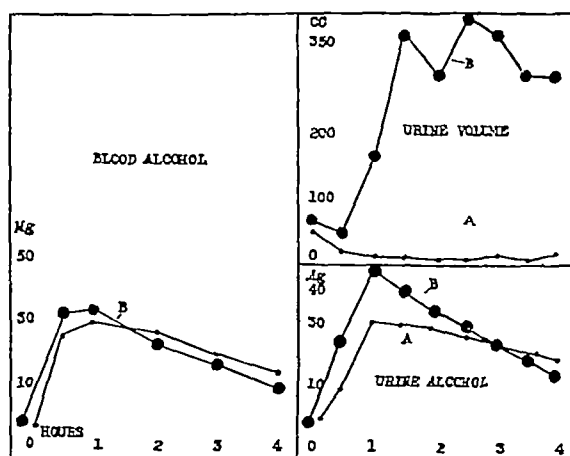


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tain cases after drinking alcohol and extra water was considerably increased. However, this was not of practical value since the normal individual, without forcing water, excreted in the urine 0.1 to 0.9 per cent of the ingested alcohol in four hours, compared with 16 to 34 per cent when the water intake was forced, and the amount of urine varied from 1570 to 3495 cc. Furthermore, in the marked diuresis in untreated diabetes insipidus 1.4 to 3.2 per cent of the alcohol was eliminated in the urine during the test period, compared with 0.07 to 0.22 per cent when the disease was controlled with pituitrin and the urine output was practically normal. Forcing large amounts of water only increased the excretion of alcohol in the urine to approximately 1 to 3 per cent.

ALCOHOL TOLERANCE IN DIABETES MELLITUS,  
WITH AND WITHOUT INSULIN THERAPY

The consideration of the immediate effect of alcohol on the blood and urine alcohol concentra-

viduals (Chart 1). However, the important finding was that the maximum alcohol concentration of the blood and urine about one hour after the alcohol meal was appreciably higher in the diabetic patients, although the fasting blood and urine alcohol concentrations were normal. The cause for this is conjectural. The greater rise may be due to an increased rate of absorption of alcohol. Possibly diabetic patients cannot metabolize the alcohol as rapidly as normal persons, so that there is a greater accumulation of alcohol in the blood and greater concentration in the urine. Incidentally, there was some decrease in the blood sugar level during the test period.

Haggard and Greenberg<sup>16</sup> found that increasing the blood sugar in rats greatly lessened the pharmacological effect of alcohol that had been absorbed. If this were true clinically, certain diabetic patients would have an increased tolerance to alcohol. However, the toxic effect of alcohol was much the same in the diabetic patients as in the normal persons, although 2 of the former ex-

Table 1 *Alcohol Tolerance in Diabetes Mellitus without and with Insulin Injection*

CASE No.	DETERMINA- TION	CONTROL TEST										INSULIN ADMINISTERED									
		HOURS AFTER ALCOHOL INGESTION										HOURS AFTER ALCOHOL INGESTION									
		0	½	1	1½	2	2½	3	3½	4		0	½	1	1½	2	2½	3	3½	4	
		mg %	mg %	mg %	mg %	mg %	mg %	mg %	mg %	mg %		mg %	mg %	mg %	mg %	mg %	mg %	mg %	mg %	mg %	mg %
1	Blood sugar	315	310	303		266		266		261											
	Blood alcohol	0	76	63		40		31		13											
	Urine alcohol	0.9	51	93	72	48	34	25	17	6											
2	Blood sugar	290	305	272	278	268		268		266		336	293	276		195		99		89	
	Blood alcohol	0	78	—	52	44		37		20		3.0	78	69		45		27		19	
	Urine alcohol	0.6	31	88	77	59	61	46	41	31		0.3	9	31	49	51	48	44	32	25	
3	Blood sugar	167	170	181		140	129					237	168	158		55	57				
	Blood alcohol	1.0	47	63	55	47	43					6.5	54	62		46	37				
	Urine alcohol	0.4	13	88	83	64	52					0.8	18	91	81		59				
4	Blood sugar	110	131	126		103						186	162	102		87		72		79	
	Blood alcohol	0	43	51		48						0	45	54		49		32		18	
	Urine alcohol	1.6	23	48	43	56						0.8	25	52	49	55	—	46	38	31	
5	Blood sugar	179	183	179		166		148		147		233	154	142		82		113		127	
	Blood alcohol	0	44	48		44		30		22		4.0	47	51		44		29		17	
	Urine alcohol	0.5	9	61	74	55	51	43	37	30		1.3	15	65	69	64	59	49	33	22	
6	Blood sugar	147	148	143		122		107		96		176	164	148		73		87		89	
	Blood alcohol	0	37	49	—	40		26		9		0	49	49		41		26		14	
	Urine alcohol	0	2	75	70	51	—	34	27	17		0	7	83	63	57	49	44	36	23	
Average blood alcohol		0.2	54	55		46		31		16		2.7	55	57		45		29		17	
Average urine alcohol		0.7	22	76	70	56	50	37	31	21		0.6	15	65	62	57	54	46	35	25	

\*Twenty five units were injected in Case 2. 20 units in Case 3 and 10 units each in Cases 4, 5 and 6.

tion and its toxicity in patients with diabetes mellitus is an important and practical problem.

The alcohol-tolerance curves were determined in 6 patients with diabetes mellitus and compared with those obtained in normal people. The blood and urine also were examined for sugar. There was no acetone or diacetic acid in the urine specimens.

There was a similar relation between the blood and urine alcohol levels in the diabetic patients without insulin therapy as in the normal indi-

viduals (Chart 1). However, the important finding was that the maximum alcohol concentration of the blood and urine about one hour after the alcohol meal was appreciably higher in the diabetic patients, although the fasting blood and urine alcohol concentrations were normal.

There have been several reports<sup>17-21</sup> suggesting that insulin causes an increase in the rate of disappearance of alcohol from the blood. It seemed to us that if this were correct, it could be proved in diabetic patients in whom the blood sugar could be changed with insulin from a high to a low level in a short period of time. Consequently, the alcohol-tolerance tests were repeated in these patients after an interval of several

days, when 10 to 25 units of insulin were injected subcutaneously immediately before the alcohol was ingested (Table 1)

It was observed that insulin did not alter the blood and urine alcohol curves, despite the marked drop in the blood sugar to a hypoglycemic level during the test period (Chart 4) In fact,

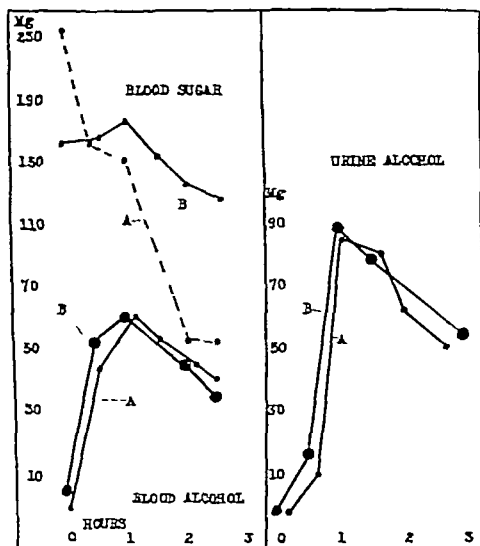


Chart 4 Blood and Urine Findings in a Case of Diabetes Mellitus

*Simultaneous curves showing the blood and urine alcoholic contents and the urine volume in a man with diabetes mellitus after the ingestion of 40 cc of absolute alcohol with (A) and without (B) the injection of 20 units of insulin*

the curves were practically identical with the control tests. It was obvious from these experiments that insulin does not affect alcohol metabolism in diabetes mellitus. Furthermore, it produced no change in the toxic symptoms caused by the alcohol. Nevertheless, during hypoglycemia a toxicity appeared which was no doubt due to the hypoglycemia and not to the alcoholemia. In addition, 0.4 to 1.0 per cent of the ingested alcohol was excreted in the urine in four hours, and this amount was not appreciably affected by the injection of insulin.

A few investigators have observed that insulin increased the rate with which alcohol disappeared from the body. Supniewski<sup>17</sup> showed that the subcutaneous administration of insulin into normal animals at the same time as alcohol was given caused the blood alcohol to be reduced. Aoki<sup>18</sup> noted a hypoalcoholemia in fowls ninety minutes after the injection of insulin. Widmark<sup>15</sup> found that insulin increased the rate of disappearance of alcohol in dogs as much as 200 per cent. Newman and Cutting<sup>19</sup> obtained a 50 per cent in-

crease in alcohol metabolism with therapeutic doses of insulin in human subjects. Schlichting<sup>20</sup> also observed that insulin hastened alcohol metabolism. From experiments made on subjects with normal blood sugar, Bickel<sup>21</sup> concluded that insulin was effective in accelerating the speed of alcohol metabolism by lowering the blood sugar, and that when this was prevented by ingestion of sugar no increase in rate occurred.

In contrast, there is good evidence that insulin has no effect on alcohol metabolism. Hirschfelder and Maxwell<sup>22</sup> determined that insulin did not increase the oxidation of alcohol in the body or antagonize its toxic effect. Dell'Acqua,<sup>23</sup> as well as Lang and von Schlick,<sup>24</sup> could perceive no effect of insulin on alcoholemia. Fleming and Reynolds<sup>25</sup> found that the injection of insulin into human beings did not modify the concentration of alcohol in the blood after the intravenous administration of alcohol. Siegmund and Flohr<sup>26</sup> obtained no evidence in 3 healthy men that medication with insulin reduced the symptoms or hastened the disappearance of the signs of intoxication. These findings agree with my results obtained in the patients with diabetes.

#### FOOD AND ALCOHOL TOLERANCE

It has long been known that food in the stomach has an inhibitory effect on the symptoms of alcohol intoxication. This has been attributed to the influence of food in decreasing the absorption of alcohol from the stomach into the blood stream.

This problem was studied in 4 patients with diabetes mellitus, in addition to the experiments on the effect of alcohol with and without the administration of insulin. In these tests the patients took a normal-sized breakfast. Approximately one hour later they received the standard dose of alcohol. In 2 cases insulin was injected just before the alcohol intake. The results were very striking (Chart 5). It is clear that the maximum concentrations of alcohol in the blood and urine after the ingestion of food and alcohol were much lower than they were when food was omitted. The addition of insulin injection to food made no great difference in the results.

An important observation was that the alcoholic symptoms following the ingestion of food were greatly decreased and hardly noticeable. Incidentally, similar results were obtained in patients with diabetes insipidus.

Just how food taken with alcohol causes a lowering of blood and urine alcohol levels is a controversial question. The action may be explained by a decreased rate of absorption of alcohol, as suggested by Mellanby.<sup>27</sup> If this were

tain cases after drinking alcohol and extra water was considerably increased. However, this was not of practical value since the normal individual, without forcing water, excreted in the urine 0.1 to 0.9 per cent of the ingested alcohol in four hours, compared with 16 to 34 per cent when the water intake was forced, and the amount of urine varied from 1570 to 3495 cc. Furthermore, in the marked diuresis in untreated diabetes insipidus 14 to 32 per cent of the alcohol was eliminated in the urine during the test period, compared with 0.07 to 0.22 per cent when the disease was controlled with pituitrin and the urine output was practically normal. Forcing large amounts of water only increased the excretion of alcohol in the urine to approximately 1 to 3 per cent.

ALCOHOL TOLERANCE IN DIABETES MELLITUS,  
WITH AND WITHOUT INSULIN THERAPY

The consideration of the immediate effect of alcohol on the blood and urine alcohol concentra-

viduals (Chart 1). However, the important finding was that the maximum alcohol concentration of the blood and urine about one hour after the alcohol meal was appreciably higher in the diabetic patients, although the fasting blood and urine alcohol concentrations were normal. The cause for this is conjectural. The greater rise may be due to an increased rate of absorption of alcohol. Possibly diabetic patients cannot metabolize the alcohol as rapidly as normal persons, so that there is a greater accumulation of alcohol in the blood and greater concentration in the urine. Incidentally, there was some decrease in the blood sugar level during the test period.

Haggard and Greenberg<sup>16</sup> found that increasing the blood sugar in rats greatly lessened the pharmacological effect of alcohol that had been absorbed. If this were true clinically, certain diabetic patients would have an increased tolerance to alcohol. However, the toxic effect of alcohol was much the same in the diabetic patients as in the normal persons, although 2 of the former ex-

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3	Blood sugar	167	170	181		140	129					237	168	158		55	57				
	Blood alcohol	1.0	47	63	55	47	43					6.5	54	62		46	37				
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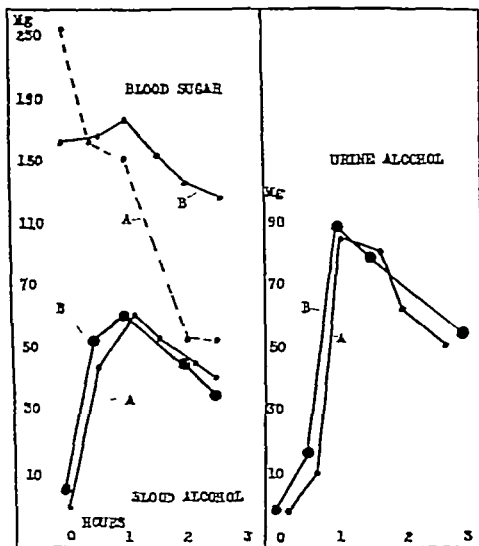


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the case, the alcohol would disappear more slowly and remain in the body longer when food was taken. However, Carpenter and Lee<sup>28</sup> found that this was not the case. They examined the alcohol in expired air after the ingestion of alcohol and glucose, and found that it disappeared more rapidly than when no glucose was given. This raises the question whether the disappearance of alcohol is due to its combustion or to its transformation into some other substance. Southgate<sup>29</sup> ascribed this phenomenon not to delayed absorption but to the fact that a considerable fraction of the ingested alcohol is never manifested in the blood. This indicates that it is due to some chemical reaction. On the other hand, the experiments of Fleming

were increased in the former. This suggests that pituitrin causes greater retention of alcohol in the tissues of these patients than is indicated by the concentrations of blood and urine alcohol.

The appearance of an increase in the blood and urine alcohol levels following the ingestion of alcohol in patients with diabetes mellitus indicates that there is an increased rate of absorption of the drug in this disease, or that the alcohol cannot be metabolized as quickly as in normal cases. Even insulin had no effect on the blood and urine alcohol levels or on the symptoms of alcohol intoxication in diabetes mellitus.

No evidence was supplied that alcohol is more harmful to the diabetic patient than to the normal person, since the toxic effect of alcohol was much the same in both, although the alcohol curves were appreciably higher in the former. However, alcohol should not be recommended for the diabetic patient, because an alcoholic odor in his breath may lead to confusion in the diagnosis of coma due to insulin or acidosis.

It was interesting that food caused a decrease in the concentrations of blood and urine alcohol and also in the toxic symptoms following the ingestion of alcohol. Although this has been attributed to a physical action whereby the rate of alcohol absorption is decreased, there is other evidence which suggests that the cause may be a chemical reaction in which the metabolism of alcohol is increased.

The general relation between the concentrations of blood and urine alcohol appears to be that during the period of alcohol absorption its concentration in the blood is higher than that in the urine. One hour after the ingestion of alcohol the alcohol level of the urine was slightly higher than that of the blood and remained so during the period of alcohol decline. Nevertheless, the two levels were very close, even though large amounts of urine were voided. This suggests that alcohol passes through the kidneys into the urine by a simple process of diffusion. The reason for this slight difference has been explained<sup>32</sup> by the alcohol level's being slightly higher in arterial than in venous blood, and consequently giving the slight variation between the alcohol concentrations of the urine and of venous blood.

#### SUMMARY

This paper presents a study on some alcohol tolerance tests in normal persons and in patients with diabetes insipidus and diabetes mellitus following the ingestion of 0.6 cc of absolute alcohol per kilogram of body weight. The influences of insulin,

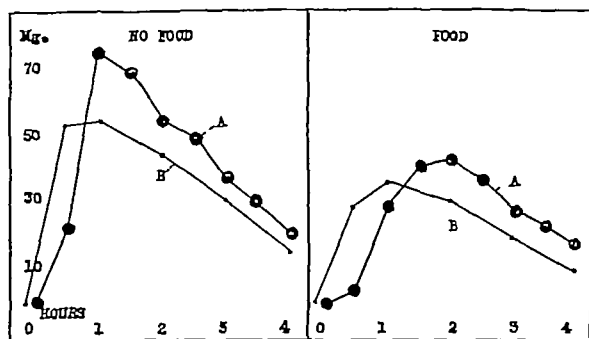


Chart 5 Response to Ingestion of Alcohol in Relation to Food

*Average curves for urine (A) and blood (B) alcoholic contents obtained in 4 patients with diabetes mellitus after the ingestion of 0.6 cc of absolute alcohol per kilogram of body weight, with and without the intake of food*

and Reynolds<sup>25</sup> suggested that certain foods do not affect alcohol metabolism. They gave egg albumin, milk, cream and olive oil after the intravenous injection of alcohol and found no significant change in the rate of disappearance of alcohol from the blood.

#### DISCUSSION

The study of alcohol tolerance is a fascinating one, although somewhat perplexing. The proper explanation of the results obtained in this investigation is at present uncertain because our knowledge of the intermediary metabolism and certain aspects of the utilization of alcohol in the body is incomplete. Insulin and pituitrin have been shown to have antagonistic effects on carbohydrate<sup>30</sup> and fat metabolism<sup>31</sup>. The data here reported suggest that the two substances do not influence alcohol metabolism in opposite ways. Pituitrin decreased the blood and urine alcohol levels in patients with diabetes insipidus and in normal individuals, but in spite of this the symptoms of alcoholic intoxica-

pituitrin, food and forced water intake on these tests were determined

Symptoms of alcoholic intoxication appeared in these people when the blood and urine alcohol concentrations were below 63 mg per cent, in comparison to much higher levels reported by others

The blood and urine alcohol curves after the test meal were very slightly higher in patients with diabetes insipidus than in normal persons. Pituitrin reduced the blood and urine alcohol levels in both these groups, yet notwithstanding this it increased considerably the symptoms of alcoholic intoxication in the former

In the patients with diabetes mellitus the blood and urine alcohol levels after the ingestion of alcohol were appreciably higher than normal, although the symptoms of alcoholic intoxication were much the same. The administration of insulin had no effect on the alcohol curves or on the symptoms of alcoholic intoxication. It appears that alcohol is no more harmful to the diabetic patient than to the normal individual, although an alcoholic odor on the breath may cause confusion in the diagnosis of coma due to insulin or acidosis

The ingestion of food before the ingestion of alcohol produced a striking decrease in the blood and urine alcohol levels and in the symptoms of alcohol intoxication in diabetic patients

The diuresis resulting from forced water intake and uncontrolled diabetes insipidus did not dilute the concentration of alcohol in the urine, but increased the total amount of alcohol excreted therein. Nevertheless, forcing water in the case of an alcoholic patient would not produce any appreciable results in therapy, because the total alcohol eliminated by this method is small compared to the amount of alcohol ingested

189 Bay State Road.

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#### SUMMARY

This paper presents a study on some alcohol tolerance tests in normal persons and in patients with diabetes insipidus and diabetes mellitus following the ingestion of 0.6 cc of absolute alcohol per kilogram of body weight. The influences of insulin,

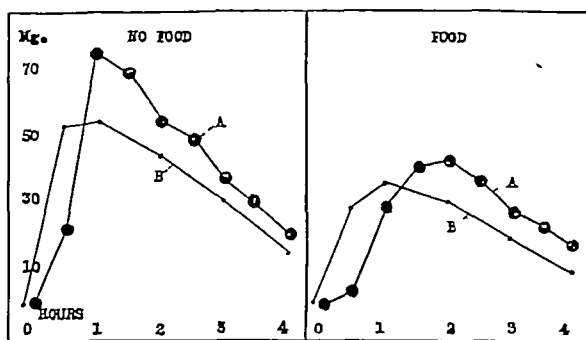


Chart 5 Response to Ingestion of Alcohol in Relation to Food

*Average curves for urine (A) and blood (B) alcoholic contents obtained in 4 patients with diabetes mellitus after the ingestion of 0.6 cc of absolute alcohol per kilogram of body weight, with and without the intake of food*

and Reynolds<sup>25</sup> suggested that certain foods do not affect alcohol metabolism. They gave egg albumin, milk, cream and olive oil after the intravenous injection of alcohol and found no significant change in the rate of disappearance of alcohol from the blood.

#### DISCUSSION

The study of alcohol tolerance is a fascinating one, although somewhat perplexing. The proper explanation of the results obtained in this investigation is at present uncertain because our knowledge of the intermediary metabolism and certain aspects of the utilization of alcohol in the body is incomplete. Insulin and pituitrin have been shown to have antagonistic effects on carbohydrate<sup>30</sup> and fat metabolism<sup>31</sup>. The data here reported suggest that the two substances do not influence alcohol metabolism in opposite ways. Pituitrin decreased the blood and urine alcohol levels in patients with diabetes insipidus and in normal individuals, but in spite of this the symptoms of alcoholic intoxica-

## GASTROSCOPY AND PERITONEOSCOPY

The most useful new adjuncts to diagnosis aside from laboratory tests are the gastroscope and the peritoneoscopy.<sup>2</sup> Lesions within the stomach are often so baffling to the roentgenologist that he welcomes the aid of the gastroscopist. Experience in this field will often lead to a correct interpretation of the pathologic process or lack of it, and thus bring about the logical therapeutic approach. Thus early manifestations of malignancy may be recognized in a curable state, and benign lesions may be treated on a conservative basis with greater assurance of success.

Peritoneoscopy is a comparatively safe and simple procedure. The patient has little discomfort during it, and may be up and about within twenty-four hours. When the usual methods of diagnosis fail to solve an intra-abdominal problem, we can often settle the question by peritoneoscopy. So far, one of its most useful applications has been in advanced carcinoma of the stomach. If there are metastases to the liver or peritoneum exploratory laparotomy should be avoided, since under these circumstances cure is impossible and palliative surgery is rarely worthwhile, also, one third of the patients in this group succumb during their post-operative convalescence. In a high percentage of doubtful cases of cancer of the stomach, Benedict<sup>2</sup> has been able to determine the operability in a correct manner, an accomplishment which has reduced to a minimum the number of useless exploratory laparotomies in this disease. Peritoneoscopy is helpful in many other doubtful intra-abdominal conditions, and more use will be made of it as experience grows and results are properly evaluated.

## HEALING OF WOUNDS

Methods of incision have changed little in many years, and aside from the careful avoidance of nerve injury a surgeon may safely employ any approach to a given area that best suits his purpose. Considerable attention has been given to the use of suture material in connection with the healing of wounds, and it seems that surgery throughout the country is progressing toward those ideal principles so carefully laid down by Halsted more than a quarter of a century ago. Cleanliness, gentleness, sharp dissection, hemostasis, avoidance of dead space and the prevention of foreign bodies in the wound have been accepted as the criteria of good surgery and perfect wound healing. Fine silk, instead of the usual sizes of catgut, causes less foreign-body reaction in the tissues and hence results in better wounds. Fine, malleable steel wire causes even less reaction than silk,

and is favored by some surgeons. In certain types of wounds, particularly where contamination is unavoidable, there is a tendency to employ no sutures except properly placed, through-and-through strands of pure silver wire, or especially treated non-porous, heavy, braided silk, thus avoiding all possibility of foreign material within the wound. Dehiscence, wound infection and hernia in the scar may thus be reduced to a minimum.

## HERNIA

Roscoe Graham's<sup>3</sup> explanation of the mechanism of sliding hernia is of the utmost importance. Sliding hernia of the sigmoid has been particularly difficult to reduce and repair through an inguinal incision alone. The bowel herniates between the leaves of its mesentery, and if the abdominal cavity is opened above through a separate incision and traction is exerted on the sigmoid, the bowel is easily reduced, the two leaves of the mesentery come together in a normal fashion. The defect in the inguinal canal is best repaired through the usual oblique incision after the abdominal incision has been closed.

Williams<sup>4</sup> advocates a more frequent abdominal approach in the repair of inguinal hernia. This is especially advantageous when dealing with undescended testicle and hernia.

Payne<sup>5</sup> and others favor the use of strips of fascia from the external oblique muscle in the repair of femoral hernia. Such strips have been used ever since McArthur suggested them in the repair of the defects of inguinal hernia.

Gallie and Le Mesurier's<sup>6</sup> contribution—the repair of the hernia with strips of fascia lata—has been widely adopted, and with great success. Certainly many defects could not otherwise be corrected.

## APPENDICITIS

The educational campaign against the use of cathartics in acute abdominal discomfort has succeeded in reducing the mortality from appendicitis in Philadelphia.<sup>7</sup> A program of widespread activity in this direction elsewhere throughout the country is in order.

In adult patients with peritonitis complicating appendicitis, there is considerable evidence in favor of delayed surgery. The highest mortality occurs in such patients when operated on between the third and sixth days of the disease. This explains the increasing mortality in acute appendicitis. Many cases are still treated expectantly in the home, even under the guidance of a physician. As soon as rupture has taken place, with the resultant spreading peritonitis, the patient is sent to the hospital, if operation is immediately undertaken.

## REPORT ON MEDICAL PROGRESS

## ABDOMINAL SURGERY

ARTHUR W ALLEN, M D \*

BOSTON

RECENT advances in surgery have been attained through improvements in technical procedures, more perfectly controlled anesthesia and a gradually increasing knowledge of pathologic physiology

## PREOPERATIVE AND POSTOPERATIVE CARE

We have often seen a well-accomplished surgical operation fail because of improper preparation of the patient and a lack of understanding of the physiological and biochemical factors at fault. Valuable contributions have been made in this field within recent years. Since in such a large proportion of cases the principles involved apply to patients with intra-abdominal lesions, we shall stress their importance in this paper.

It is incredible but true that many surgeons have no hesitation in subjecting patients to a serious abdominal operation in a state of fatigue and general debility, with little or no thought of the effect of the superimposed trauma. Thus, a tired business man or a housewife, having redoubled his or her efforts for days and weeks, enters the hospital late in the day and is subjected to a major operation early the next morning. In casting about for the reasons why such a patient has done poorly after operation, the last thought is usually the obvious one—a tired horse has been entered in a race. This mistake, which is made even by men of high intelligence, is one of the chief causes of disaster. A few days of training in the hospital environment can often be utilized to good advantage. A correction of water and salt balance, a preliminary transfusion, and an evaluation of sedatives in addition to rest and nourishment often make the difference between a smooth and a stormy convalescence, and even between life and death.

In the postoperative care of this patient one must have a baseline from which to start, so that the patient's needs can be met in an orderly manner and not by general rule. Fluid must be administered, but the amount may be too great in a given period for the patient in question, producing a fatal pulmonary edema or cardiac dilatation. Salt must be limited to his physiological needs or water will be retained within the tissues. Glucose

can be utilized up to certain limits, and a moderate excess is offset by loss through the kidneys. A reasonably safe rule is use 50 gm of glucose in each liter of normal saline solution and of distilled water, alternately. A patient with a high intestinal fistula or an inlying Levine tube needs more salt than one whose hydrochloric acid is retained within the intestinal tract. The average adult patient needs approximately 3 liters of fluid, evenly distributed in each twenty-four hours. A rough guide is the urinary output, which should average not less than 1000 cc per day. Depleted patients and those who have had large resections should be routinely transfused, those who have lost an abnormal amount of blood should receive enough to bring the blood content up to a low normal level.

Patients should receive a proper amount of sedatives, if any is to be given, where there is need for maintaining the tone of the small bowel, morphine is the drug of choice. The only guide as to the amount should be the rate of respiration, which should not descend below 12 per minute. Pitressin has been advocated by some observers, its action is primarily upon the large bowel, if used, its administration should be started on the operating table and continued until the need for it has passed, that is for forty-eight or seventy-two hours. If it is given after distention has taken place, a rupture of the large intestine may follow. One must realize that after laparotomy there is a stage of physiologic ileus. Food should be withheld and the tone of the small bowel maintained until normal peristalsis has returned. If this precaution is neglected the patient's abdomen will become distended and vomiting will ensue. Fine and Levenson<sup>1</sup> have contributed much to the problem of gaseous distention after operation. They have shown that milk, orange juice, carbohydrates and protein in the order named, all produce gas. Small amounts of water, followed by consommé, tea, cooked cereal, milk and lime water should be used until intestinal elimination has become adequate. Postoperatively patients should be exercised by deep breathing, frequent turning, and movements of the arms and legs. The restless patient almost never develops phlebitis and pulmonary embolus, while the fat, lethargic individual is prone to do so.

\* Lecturer in surgery Harvard Medical School chief of the East Surgical Service, Massachusetts General Hospital

may be undertaken on an erroneous diagnosis, but few cases should be treated conservatively without the confirmation of paracentesis. Indications for surgery are unrelievable pain and nausea, jaundice, and a palpable mass. Biliary decompression relieves the pain, jejunostomy for feeding and a Levine tube in the stomach relieve the nausea. Drainage of the pancreas itself should be limited to adequate drainage of the lesser peritoneal cavity.

Adenomas of the pancreas are being reported from time to time. These cases are apt to be suspected by the psychiatrist, since the convulsive phase of hyperinsulinism is prone to be interpreted as a form of epilepsy. Marked emaciation and a prolonged false psychosis lead to the wrong interpretation of symptoms. The results in a successful adenectomy are dramatic. The adenomas are often small, and may be situated in the head of the pancreas and on the posterior side. They have a characteristic cherry-red appearance and are usually single. Attempts at subtotal pancreatectomy in the hope of including a small, non-palpable adenoma are apt to be disappointing, since the tumor may well be left in the remaining portion of the organ.

Carcinoma of the pancreas, when limited to a small area near the papilla of Vater, may be brought to light by jaundice while still resectable. Whipple, Parsons and Mullins<sup>11</sup> have developed a rational two stage attack to relieve this situation, and have subjected 8 patients to this procedure, 1 of them lived three years after operation before recurrence in the liver caused death. In this operation the gall bladder is anastomosed to the gastrointestinal tract and the common duct is ligated. At a second operation two weeks later the duodenum and the head of the pancreas are removed en bloc. The duct of the pancreas is carefully ligated, the cut edge of the pancreas is sutured and drainage to this area is established by cigarette wicks. Continuity between the stomach and intestine is established either at the first or the second stage.

Stones in the pancreas are of the same consistence as salivary calculi, and are easily seen in an adequate roentgenogram of the region. Haggard<sup>12</sup> has collected about 140 cases from the literature, and some from his own practice. He concludes that symptoms of continued pain radiating to the back with nausea and vomiting warrant surgical interference. Following operation, fistulas are prone to develop if the stones were in the main duct. Drainage may continue for several years but finally ceases.

## STOMACH

Ulcers of the stomach should be considered malignant until proved benign. Under ideal treatment the ulcer should heal entirely within six weeks. Ulcers with cancer in them may improve under medical management, as shown by an apparently smaller crater in the roentgenogram and loss of symptoms. This may result in too long an interval between examinations, and the passing by of the stage wherein the lesion is curable by adequate resection. Recurrence of ulceration and profuse bleeding is also an indication for surgery. If the lesion is unquestionably benign, the ulcer may be destroyed by excision or cauterization, combined with some procedure aimed at increasing the alkalinity of the stomach contents. Jejunal ulcers do not occur following gastroenterostomy for gastric ulcer. Polyposis of the stomach, leiomyomas and suspicious ulcerations are best treated by gastrectomy. Polyps bleed and degenerate into malignancy, leiomyomas bleed periodically and spread locally. Questionable ulcerations are often found to be malignant.

Pre-pyloric ulcerations are nearly all malignant, those on the lesser curvature are so in approximately one third the cases.

Carcinoma of the stomach offers an operability of approximately 30 per cent, including the patients subjected to total gastrectomy. Approximately 20 per cent of those surviving subtotal gastrectomy live five years or more after operation.

Twenty-four total gastrectomies have now been done at the Massachusetts General Hospital, in many of the cases the prognosis was unfavorable from the beginning. The operative mortality is still 50 per cent, owing to the inclusion of cases with pancreatic and colonic involvement. The survivors had a more comfortable life, varying from a few months to four and a half years. Those dying of liver recurrence had a more comfortable exitus than did those beyond the reach of resection who died of starvation. Jejunoesophagostomy, enteroenterostomy between the loops of the jejunum and jejunostomy for feeding formed the best combination of procedures. The loop of the jejunum is attached to the diaphragm by a row of sutures running entirely around the anastomosis between the end of the esophagus and the side of the jejunum.

## DUODENUM

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death is more likely than at any other stage of the disease. Conservative physicians in previous decades continued their expectant type of treatment at home until there was spontaneous cure, or death occurred, or an obvious localized abscess developed. Under this regime the mortality was lower than it is at present. Thus it has become apparent that there is a stage of spreading peritonitis which is better treated by supportive measures until localization has taken place. Children do not seem to tolerate this method of treatment as well as do adults.

The general attitude on drainage of the abdominal cavity in appendicitis has changed decidedly. There was a time when the dictum was, "In case of doubt, drain", it is now definitely the reverse. Except in cases with the formation of a localized abscess, drainage is contraindicated. The excess fluid may be aspirated with care and gentleness with the suction tip, and the peritoneum sutured tightly. The contaminated layers of the abdominal wall are often drained to advantage.

The detailed modern adaptation of Ochsner's regime has become of great importance in the successful management of peritoneal involvement, both as a preventive and as a curative procedure.

#### BILIARY SYSTEM

The tendency of patients with obstructive jaundice to bleed can now be controlled by the use of vitamin K and cholecystic acid. Careful laboratory studies by Stewart<sup>8</sup> and others indicate that the dosage of this vitamin and the period of time necessary to prepare such patients for operation will soon be standardized. So far, this substance cannot be obtained commercially, but it will be forthcoming at an early date. The laboratory test for the prothrombin level of the blood will soon be a matter of routine. Thus one of the chief causes of death in obstructive jaundice will be eliminated.

Much evidence has been submitted in favor of early operation in acute gall-bladder disease. It appears that the mortality in cases so treated is lower than in similar groups in which the surgeon postpones operation in the hope that the disease will quiet down. These cases are not emergency ones, to be operated on at night with inadequate assistance, but should be evaluated after dehydration has been combated. If greatly improved in twelve hours as indicated by less fever, a decrease in leukocytosis and local tenderness, one may safely wait longer, in the majority of cases the patient will come to operation a week or ten days after the acute onset in a better condition for operation. The gangrenous gall bladders that need early surgery do not quiet down, but the high white-cell count, fever and local tenderness per-

sist after the loss of fluid has been offset. In these cases operation should be carried out as soon as reasonably ideal conditions can be obtained.

In cases of chronic gall-bladder disease, artificial edema greatly facilitates the preservation of an adequate amount of serous coat for peritomization of the hepatic fissure. This was brought to my attention by Dr. Alfred M. Rowley,<sup>9</sup> of Hartford, Connecticut, and was probably first suggested by Bevan.<sup>10</sup> Salt solution injected through a fine needle beneath the serous covering of the gall bladder makes its enucleation much easier—whether this is done from the fundus toward the ducts or from below upward. We have all become conscious of the importance of the common duct, and in diseases of the biliary tract realize that injury to this structure must be avoided at all costs. Anomalies of the ducts and the blood supply are found more frequently than has been realized. A Russian anatomist reports 10 per cent of anomalies in a large number of dissections. There are fewer injuries to the common duct if the gall bladder is carefully and bloodlessly dissected out from the fundus toward the ducts. One disadvantage of this method is the possibility of forcing small stones through the cystic duct into the common duct, but this can often be prevented by placing a clamp on the cystic duct before beginning the dissection. The common duct should be explored and its outlet into the duodenum gently and gradually dilated with suitable bougies, if necessary. The width of dilatation of the sphincter of Oddi should always be less than the diameter of the duct, and never more than the size of the stones that might be hidden within the hepatic ducts. A 7-mm. Bake's dilator or a No. 21 French bougie is usually adequate. Indications for exploration of the duct are numerous. Frequent attacks of pain, vomiting, chills and fever, jaundice, small stones, a large cystic duct, a large or thickened common duct, thickening in the head of the pancreas, palpable stones within the ducts and a stoneless gall bladder are some of the commoner reasons for exploration. Over one third of the gall-bladder operations at the Massachusetts General Hospital are accompanied by duct exploration, and in approximately one third of these, stones are removed.

#### PANCREAS

In acute pancreatitis there is a tendency toward a nonoperative, supportive type of treatment. The diagnosis is often difficult, but can finally be determined by paracentesis with a small needle. If thin, bloody fluid is obtained in the presence of other adequate symptoms and signs, the diagnosis should be considered as established. Operation



may be undertaken on an erroneous diagnosis, but few cases should be treated conservatively without the confirmation of paracentesis. Indications for surgery are unrelievable pain and nausea, jaundice, and a palpable mass. Biliary decompression relieves the pain, jejunostomy for feeding and a Levine tube in the stomach relieve the nausea. Drainage of the pancreas itself should be limited to adequate drainage of the lesser peritoneal cavity.

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Roscoe Graham,<sup>13</sup> which consists of holding a graft from the omentum over the opening by means of sutures passed above, below and through the ulcer and tied loosely over the graft

Secondly, cicatricial obstruction may take place when the ulcer is near the pylorus and the condition has had many flares and cures. This is a mechanical problem occurring mainly in patients beyond middle life, the condition responds well to simple gastroenterostomy or pyloroplasty

Thirdly, profuse bleeding is usually associated with ulcers of the posterior wall which have eroded the pancreaticoduodenal artery. Spontaneous remission usually occurs in patients under fifty years of age. If they are nearing this age, a radical attempt to rid them of the tendency to ulcer should be made in a quiescent stage—usually not under six weeks from a given period of severe bleeding. The tendency for ulcers to recur and to become intractable to conservative measures is due to their deep penetration into the pancreas and the complete loss of continuity of the duodenum in this area. Patients over fifty years of age with this lesion have enough rigidity in the wall of the bleeding vessel to interfere with the organization of an adequate clot, and death from hemorrhage occurs in one third of these cases. Radical operation during the phase of bleeding is rarely indicated, but when it is, the indication is definite, and the operation if undertaken within forty-eight hours of the onset of hemorrhage carries little more risk than does an operation by election.

Fourthly, intractable symptoms occur in about 5 per cent of duodenal ulcerations. These may be due to economic or social circumstances. Radical subtotal gastrectomy is indicated in such cases. This should include the excision of all the gastric mucosa from the pylorus to the junction of the middle and upper thirds of the stomach, and of the first portion of the duodenum when practical.

Fifthly, gastrojejunal ulcers rarely respond well to conservative measures. If bleeding and pain persist and roentgenograms show no progress, surgery should be undertaken. When feasible a subtotal gastrectomy should be done. If operation is postponed a gastrojejuno-colic fistula may develop, and surgery then becomes imperative and increasingly dangerous. The fistula should be excised in an aseptic manner, with the restoration of normal function. After recovery from the operation, reactivation of the original duodenal ulcer is liable to occur, then a subtotal gastrectomy in a clean field gives maximum protection.

#### REGIONAL ENTERITIS

Regional enteritis has become a recognized entity. Long classified as non-specific granuloma

and often diagnosed clinically as tuberculosis, it follows a pattern sufficiently definite to warrant considerable interest. The symptoms are vague and somewhat variable. Abdominal pain with diarrhea, loss of weight and tenderness in the right lower quadrant are often followed by the formation of an abscess, with ultimate fistulous tracts running to the perineum or to a previous exploratory or appendectomy incision. The commonest site is the terminal ileum, but the cecum is often involved. Other segments of small intestine are affected at times, and more rarely segments of the colon become diseased. Reichert and Mathes<sup>14</sup> have reproduced a similar condition in animals by injecting the lymphatics of the ileocecal region. Crohn, Ginzburg and Oppenheimer<sup>15</sup> have done much to clarify the pathologic picture and have added greatly to the knowledge of the disease. The etiology remains unknown. The most successful form of treatment thus far employed is a wide, radical resection of the diseased bowel with its node-bearing areas. Mixter<sup>16</sup> has reported a series of approximately 20 cases so treated, with excellent results. Recurrence occurs in a certain proportion of cases, it may be due to inadequate removal of the lymphatics, or to the inclusion in the resected portion of an insufficient margin of apparently normal bowel.

#### COLON

Idiopathic ulcerative colitis warrants permanent ileostomy in approximately one third of the cases, and according to McKittrick and Miller<sup>17</sup> about half these patients require total colectomy before they can lead reasonably normal lives. Patients with this condition should not be allowed to become too ill or depleted before one resorts to surgery, or the mortality will be unjustifiably high.

Polyposis involving all or various segments of the colon justifies colectomy. There is a marked familial tendency in this disease. The rectum can be saved in many cases, and the polyps in this segment can be watched and fulgurated at intervals through the proctoscope.

Carcinoma of the colon is a frequent condition, and such a lesion should be suspected if there is any change in bowel habit, blood or mucus in the stools, anemia associated with disturbances of the digestive tract, or a palpable intra-abdominal mass, loss of weight and obstructive symptoms indicate an advanced lesion, often inoperable. The total operability, however, is high,—over 70 per cent,—as is the curability—over 50 per cent. The operative mortality averages 15 per cent.

The right colon should be resected in two stages. A preliminary ileotransverse colostomy should be followed ten or fourteen days later by a

colectomy on the right. The supposition of protection of the peritoneum by a previous operation is substantiated by research in this field by Collier, Ransom and Rife<sup>18</sup>. Lesions in the transverse colon should be attacked by a preliminary proximal drainage. The left colon may be decompressed by cecostomy, and this has been a very satisfactory procedure preliminary to resection. With the use of a large tube the colon can be adequately prepared, and by infolding the cecum on the tube at the time of cecostomy, it can be made to heal spontaneously when no longer needed. Devine<sup>19</sup> has recently described a method of "defunctioning" the diseased left colon and rectum by a preliminary double-barreled proximal transverse colostomy. The bowel is divided between clamps with a cautery, and the limbs of the bowel are sutured together over a distance of 8 cm., the ends being left long enough to be brought to the surface and separated by the entire abdominal wall. The distal segment can be irrigated so that in two or three weeks it is actually free of infection. The diseased bowel is then resected through a clean field. When the need of the proximal colostomy has passed, the spur is crushed by special clamps, the blades of which are applied separately and then brought into contact from the surface. This method has much to commend it and is likely to be extensively used, especially by those who have not perfected aseptic anastomosis and those who have been disappointed in the adequate functioning of cecostomy.

Modifications of the Parker-Kerr type of aseptic intestinal anastomosis have given the lowest mortality of any method used at the Massachusetts General Hospital. Accurate attention to details in the technic is essential, and if properly executed these procedures will yield excellent results.

#### CARCINOMA OF THE RECTUM

Radical combined abdominoperineal resection after the method of Miles<sup>20</sup> is the procedure of choice. It can be safely applied to approximately 75 per cent of cases. Careful preoperative preparation, attention to technical details, spinal anesthesia and supportive postoperative measures have reduced the mortality to approximately 10 per cent. Patients who are poor risks, those with large infiltrating lesions and those with any degree of obstruction should be operated on in two stages. The preliminary stage may be any of the proximal drainage procedures that are found effective in the hands of the operator. Devine's<sup>19</sup> defunctioning transverse colostomy more nearly meets all requirements than any other so far advocated.

#### INTESTINAL OBSTRUCTION

The application of continuous suction to an *inlying* stomach catheter, as employed by Wangersteen and Paine,<sup>21</sup> has eliminated the need of many operations for ileus. If the obstruction is complete and of a mechanical nature, this procedure may be carried on to a period when operative interference is impossible. In maintaining the body fluids and salts and supporting the patient by blood transfusions, one may not realize that obstruction exists. Thus if the total fluids withdrawn from the upper gastrointestinal tract are closely watched, and a time limit of not more than three days of such treatment is set, the opportunity for surgical intervention will not be lost.

Miller and Abbott<sup>22</sup> have devised an ingenious long triple tube of nasal-catheter size that can be introduced slowly and, by the aid of a small balloon near the tip, passed all the way down through the intestine. That this tube should pass down the intestine and at the same time allow suction of fluid contents seems amazing. That it will in certain cases reach the actual point of obstruction, and in cases where the obstruction is not complete will relieve the patient and avoid a dangerous operation, is an established fact. Practice is necessary to get the end of the tube through the pylorus, and frequent roentgenograms are needed until this has been accomplished. Dr. George W. Holmes<sup>23</sup> has made the helpful suggestion that iced drinks will cause the pylorus to open and this point may be of great aid in the successful use of the tube. Scudder, Zwemer and Truszkowski<sup>24</sup> have studied a large series of cases of intestinal obstruction. Many of the symptoms in these patients, they found, are due to a heightened blood-potassium level. This may be produced in other ways, such as fistula of the small bowel, adrenal insufficiency and potassium poisoning. Lethal levels of blood potassium are frequently found as a result of experimental obstruction, and occasionally in patients. Rapid return to a normal level follows operative removal of the obstruction.

#### MECKEL'S DIVERTICULUM

In adults, this condition is rarely diagnosed correctly before operation. In the acute stage of inflammation the preoperative diagnosis is usually intestinal obstruction. In children the diagnosis is frequently made on the basis of abdominal pain and blood in the stools. Owing to embryonal rests of gastric mucosa within the diverticulum, all the symptoms and signs of so-called peptic ulcer may be present—even, on occasion, those of acute perforation. One of the most

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Secondly, cicatricial obstruction may take place when the ulcer is near the pylorus and the condition has had many flares and cures. This is a mechanical problem occurring mainly in patients beyond middle life, the condition responds well to simple gastroenterostomy or pyloroplasty

Thirdly, profuse bleeding is usually associated with ulcers of the posterior wall which have eroded the pancreaticoduodenal artery. Spontaneous remission usually occurs in patients under fifty years of age. If they are nearing this age, a radical attempt to rid them of the tendency to ulcer should be made in a quiescent stage—usually not under six weeks from a given period of severe bleeding. The tendency for ulcers to recur and to become intractable to conservative measures is due to their deep penetration into the pancreas and the complete loss of continuity of the duodenum in this area. Patients over fifty years of age with this lesion have enough rigidity in the wall of the bleeding vessel to interfere with the organization of an adequate clot, and death from hemorrhage occurs in one third of these cases. Radical operation during the phase of bleeding is rarely indicated, but when it is, the indication is definite, and the operation if undertaken within forty-eight hours of the onset of hemorrhage carries little more risk than does an operation by election

Fourthly, intractable symptoms occur in about 5 per cent of duodenal ulcerations. These may be due to economic or social circumstances. Radical subtotal gastrectomy is indicated in such cases. This should include the excision of all the gastric mucosa from the pylorus to the junction of the middle and upper thirds of the stomach, and of the first portion of the duodenum when practical

Fifthly, gastrojejunal ulcers rarely respond well to conservative measures. If bleeding and pain persist and roentgenograms show no progress, surgery should be undertaken. When feasible a subtotal gastrectomy should be done. If operation is postponed a gastrojejunocolic fistula may develop, and surgery then becomes imperative and increasingly dangerous. The fistula should be excised in an aseptic manner, with the restoration of normal function. After recovery from the operation, reactivation of the original duodenal ulcer is liable to occur, then a subtotal gastrectomy in a clean field gives maximum protection

#### REGIONAL ENTERITIS

Regional enteritis has become a recognized entity. Long classified as non-specific granuloma

and often diagnosed clinically as tuberculosis, it follows a pattern sufficiently definite to warrant considerable interest. The symptoms are vague and somewhat variable. Abdominal pain with diarrhea, loss of weight and tenderness in the right lower quadrant are often followed by the formation of an abscess, with ultimate fistulous tracts running to the perineum or to a previous exploratory or appendectomy incision. The commonest site is the terminal ileum, but the cecum is often involved. Other segments of small intestine are affected at times, and more rarely segments of the colon become diseased. Reichert and Mathes<sup>14</sup> have reproduced a similar condition in animals by injecting the lymphatics of the ileocecal region. Crohn, Ginzburg and Oppenheimer<sup>15</sup> have done much to clarify the pathologic picture and have added greatly to the knowledge of the disease. The etiology remains unknown. The most successful form of treatment thus far employed is a wide, radical resection of the diseased bowel with its node-bearing areas. Mixer<sup>16</sup> has reported a series of approximately 20 cases so treated, with excellent results. Recurrence occurs in a certain proportion of cases, it may be due to inadequate removal of the lymphatics, or to the inclusion in the resected portion of an insufficient margin of apparently normal bowel

#### COLON

Idiopathic ulcerative colitis warrants permanent ileostomy in approximately one third of the cases, and according to McKittrick and Miller<sup>17</sup> about half these patients require total colectomy before they can lead reasonably normal lives. Patients with this condition should not be allowed to become too ill or depleted before one resorts to surgery, or the mortality will be unjustifiably high

Polyposis involving all or various segments of the colon justifies colectomy. There is a marked familial tendency in this disease. The rectum can be saved in many cases, and the polyps in this segment can be watched and fulgurated at intervals through the proctoscope

Carcinoma of the colon is a frequent condition, and such a lesion should be suspected if there is any change in bowel habit, blood or mucus in the stools, anemia associated with disturbances of the digestive tract, or a palpable intra-abdominal mass, loss of weight and obstructive symptoms indicate an advanced lesion, often inoperable. The total operability, however, is high,—over 70 per cent,—as is the curability—over 50 per cent. The operative mortality averages 15 per cent

The right colon should be resected in two stages. A preliminary ileotransverse colostomy should be followed ten or fourteen days later by a

colectomy on the right. The supposition of protection of the peritoneum by a previous operation is substantiated by research in this field by Collier, Ransom and Rife<sup>15</sup>. Lesions in the transverse colon should be attacked by a preliminary proximal drainage. The left colon may be decompressed by cecostomy, and this has been a very satisfactory procedure preliminary to resection. With the use of a large tube the colon can be adequately prepared, and by infolding the cecum on the tube at the time of cecostomy, it can be made to heal spontaneously when no longer needed. Devine<sup>19</sup> has recently described a method of "defunctioning" the diseased left colon and rectum by a preliminary double-barreled proximal transverse colostomy. The bowel is divided between clamps with a cautery, and the limbs of the bowel are sutured together over a distance of 8 cm., the ends being left long enough to be brought to the surface and separated by the entire abdominal wall. The distal segment can be irrigated so that in two or three weeks it is actually free of infection. The diseased bowel is then resected through a clean field. When the need of the proximal colostomy has passed, the spur is crushed by special clamps, the blades of which are applied separately and then brought into contact from the surface. This method has much to commend it and is likely to be extensively used, especially by those who have not perfected aseptic anastomosis and those who have been disappointed in the adequate functioning of cecostomy.

Modifications of the Parker-Kerr type of aseptic intestinal anastomosis have given the lowest mortality of any method used at the Massachusetts General Hospital. Accurate attention to details in the technic is essential, and if properly executed these procedures will yield excellent results.

#### CARCINOMA OF THE RECTUM

Radical combined abdominoperineal resection after the method of Miles<sup>20</sup> is the procedure of choice. It can be safely applied to approximately 75 per cent of cases. Careful preoperative preparation, attention to technical details, spinal anesthesia and supportive postoperative measures have reduced the mortality to approximately 10 per cent. Patients who are poor risks, those with large infiltrating lesions and those with any degree of obstruction should be operated on in two stages. The preliminary stage may be any of the proximal drainage procedures that are found effective in the hands of the operator. Devine's<sup>19</sup> defunctioning transverse colostomy more nearly meets all requirements than any other so far advocated.

#### INTESTINAL OBSTRUCTION

The application of continuous suction to an intubing stomach catheter, as employed by Wangersteen and Paine,<sup>21</sup> has eliminated the need of many operations for ileus. If the obstruction is complete and of a mechanical nature, this procedure may be carried on to a period when operative interference is impossible. In maintaining the body fluids and salts and supporting the patient by blood transfusions, one may not realize that obstruction exists. Thus if the total fluids withdrawn from the upper gastrointestinal tract are closely watched, and a time limit of not more than three days of such treatment is set, the opportunity for surgical intervention will not be lost.

Miller and Abbott<sup>22</sup> have devised an ingenious long triple tube of nasal-catheter size that can be introduced slowly and, by the aid of a small balloon near the tip, passed all the way down through the intestine. That this tube should pass down the intestine and at the same time allow suction of fluid contents seems amazing. That it will in certain cases reach the actual point of obstruction, and in cases where the obstruction is not complete will relieve the patient and avoid a dangerous operation, is an established fact. Practice is necessary to get the end of the tube through the pylorus, and frequent roentgenograms are needed until this has been accomplished. Dr. George W. Holmes<sup>23</sup> has made the helpful suggestion that iced drinks will cause the pylorus to open and this point may be of great aid in the successful use of the tube. Scudder, Zwemer and Truszkowski<sup>24</sup> have studied a large series of cases of intestinal obstruction. Many of the symptoms in these patients, they found, are due to a heightened blood-potassium level. This may be produced in other ways, such as fistula of the small bowel, adrenal insufficiency and potassium poisoning. Lethal levels of blood potassium are frequently found as a result of experimental obstruction, and occasionally in patients. Rapid return to a normal level follows operative removal of the obstruction.

#### MECKEL'S DIVERTICULUM

In adults, this condition is rarely diagnosed correctly before operation. In the acute stage of inflammation the preoperative diagnosis is usually intestinal obstruction. In children the diagnosis is frequently made on the basis of abdominal pain and blood in the stools. Owing to embryonal rests of gastric mucosa within the diverticulum, all the symptoms and signs of so-called peptic ulcer may be present—even, on occasion, those of acute perforation. One of the most

reliable diagnostic points is tenderness directly beneath the umbilicus

#### CALCIFIED MESENTERIC LYMPH NODES

This condition is so frequently seen in patients without abdominal symptoms that inadequate significance has been attached to it. Calcification is probably the result of healing in certain cases of mesenteric adenitis. Approximately 80 per cent of children having calcified nodes on routine examination have no history of any prolonged abdominal symptoms. In the remaining 20 per cent, half of them become symptom-free in a period varying from a few months to a few years on a conservative dietary and hygienic regime. In a small number of cases symptoms persist into adult life. The symptoms are those of vague abdominal discomfort that may occur daily without actual interference with routine life or may cause recurring bouts of acute abdominal pain with nausea and vomiting. Appendectomy is often done during or following one of these acute episodes. The attacks may recur with such frequency and so little attention be paid to them by the physician that the patient is labeled a neurasthenic or hypochondriac. Careful evaluation is justifiable and, in certain cases, excision of the calcified masses is followed by a complete relief of symptoms and a restoration to robust health of an individual previously handicapped by chronic invalidism. The tenderness usually starts just at the right of and slightly below the umbilicus, and extends toward the left upper quadrant, following closely the mesenteric vessels. In a group of such adult and adolescent patients studied by Allen and Howe<sup>25</sup> at the Massachusetts General Hospital, it was found that appendectomy alone relieved

50 per cent. Appendectomy and excision of the chief mass of calcified nodes relieved 95 per cent. Those unrelieved were found to have such an extensive distribution that removal of the nodes was impracticable.

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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25071

#### PRESENTATION OF CASE

A twenty-year-old, single Russian Jewess was admitted complaining of pain and swelling just below the right knee.

About five months prior to admission the patient first noticed that while climbing stairs she had pain in the right leg just below the knee. About one month later she noted the appearance of a swelling over the painful area. The swelling was tender, the tenderness being most marked along the upper anterior surface of the left tibia. This swelling gradually increased. At times it was hot and red. She noted most discomfort in climbing stairs, running, or bending over.

In the past she had been in good health except for diphtheria two years before entry. Her tonsils had been removed about two years before admission. The family history revealed no evidence of familial disease.

Physical examination showed a well-developed and nourished woman in no acute distress. Examination of the head, neck, chest and abdomen was negative. The blood pressure was 118 systolic, 72 diastolic. On the right leg, just below the tibial tubercle, there was a hard, bony swelling about 2 cm in diameter. It was tender to pressure. The skin was not red or edematous. There was no fluctuation. All motion of the knee was normal.

The temperature was 97.8°F., the pulse 72, and respirations 17.

Examination of the urine was negative. The blood showed a red-cell count of 5,000,000 with 85 per cent hemoglobin, and a white-cell count of 8600 with 72 per cent polymorphonuclears. A blood Hinton test was negative.

X-rays showed a cyst-like area of decreased density, about 3 cm in diameter, 5 cm below the proximal epiphyseal line of the right tibia. The lesion was anterior and medial, bulging above the surface of the remainder of the bone. The cortex was markedly thinned in this area. There was increased density of the bone surrounding the lesion. No changes were visible in the soft tissues.

The patient's chart remained normal. On the fourth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. CHANNING C. SIMMONS: There are a few data that I should have liked to have but which are not available: first, x-rays of the other bones, secondly, the blood-chemistry findings, thirdly, a more detailed history, and, finally, a more careful physical examination, although presumably it was negative.

This is the x-ray film of the lesion. It is evident that this patient had a lesion in the upper end of the tibia situated about 5 cm below the knee joint. In all cases of bone tumor three chief conditions should be considered. First, is it a metabolic or generalized bone disease, such as osteitis fibrosa or Paget's disease? Secondly, is it an inflammatory condition, such as tuberculosis, syphilis or osteomyelitis? Thirdly, is it tumor, either primary or metastatic?

Let us take up the first group—the metabolic diseases. We have nothing that points to such a condition, although I should like information on several blood constituents and more data on the differential count. We also should have x-rays of the other bones, to rule out the possibility of generalized disease. If the tests were all negative, and we may assume they were, I think we can exclude the various metabolic diseases. The patient is young for Paget's disease.

The chief inflammatory conditions to be considered are tuberculosis, syphilis, which is always a possibility, and osteomyelitis. The Hinton test was negative, this presumably rules out syphilis, although in bone syphilis serological tests are negative in 35 or 40 per cent of the cases. There is nothing else that points toward syphilis. I am sorry to say, I am not very conversant with the radiological appearance of tuberculosis, but to me the film does not suggest it. I should expect more change in the joint, and more physical disability than she had. Osteomyelitis may be anything from the acute form to the chronic form known as Brodie's abscess. With that condition we usually have a history of respiratory infection such as tonsillitis, nasal infection or pneumonia preceding the attack of bone pain. She gives no history of such. In Brodie's abscess the x-ray film shows a bony defect with thickening of the bone about it, such as this film shows, so such a diagnosis has to be seriously considered. Usually, however, there is some systemic reaction. The white count should be 10,000 or 12,000 rather than 8000, and the temperature slightly elevated rather than 97.8°F. I should rule out tuberculosis and

syphilis and leave osteomyelitis to be considered later

There is no evidence in the physical examination of a primary tumor of which this might be a metastasis. Of the primary tumors of bone one would have to consider the nonmalignant and the malignant tumors. The nonmalignant types include osteoma, solitary bone cyst, which one may call tumor, and osteochondroma, which might occur in that region, though most chondromas give less the effect of thickening of the bone about the lesion. Another form of tumor is the subperiosteal cyst found in cases of neurofibromatosis, this patient had no areas of pigmentation on her body and no subcutaneous neurofibromas.

Of the malignant tumors to be considered the first is osteogenic sarcoma which usually shows bone destruction and bone formation, but there is no reactive triangle such as one usually sees. Ewing's sarcoma rarely arises in this location and usually shows more bone destruction, although atypical radiographs are not uncommon. It might be an osteogenic sarcoma but I doubt it.

My opinion is that this is either a Brodie's abscess or a chondromatous tumor with a superimposed inflamed bursa. I think a personal examination of the case would have made the diagnosis easier.

DR. TRACY B. MALLORY: Have you any comment, Dr. Hampton?

DR. AUBREY O. HAMPTON: The only thing I can add is that if we had films to show the regional soft tissue over that lesion we should see subcutaneous edema above and below, which would probably rule out tumor and make it more likely to be inflammatory. Furthermore, the dense margin around the bony defect ought to be thinner if it were due to chondroma. I should agree with Dr. Simmons that the lesion is probably a Brodie's abscess.

#### CLINICAL DIAGNOSIS

Brodie's abscess of tibia

#### DR. SIMMONS'S DIAGNOSIS

Brodie's abscess of tibia?

Chondroma of tibia?

#### ANATOMICAL DIAGNOSIS

Localized fibrous osteodystrophy of tibia

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: I am sorry Dr. Sumner M. Roberts is not here to describe first-hand his operative findings. He explored this lesion and found a very thin shell of cortical bone. Underneath, and apparently quite separate from the cortical bone,

was a spherical tumor mass which was fairly firm and felt rather gritty. This was dissected out and Dr. Benjamin Castleman, who was called over to examine it, thought that it looked in gross very much like the lesions which Jaffe<sup>1</sup> in New York has described as osteoid osteoma (Fig. 1). When the sections came through it



Figure 1 Tumor and Overlying Cortical Bone

was found that the mass consisted of rather acellular fibrous tissue containing numerous narrow trabeculae of bone. In a few areas there was a little active bone formation but for the most part it was completely inactive. We puzzled a great deal over the slides and eventually sent them to Dr. Jaffe who finally made a diagnosis of a localized fibrous osteodystrophy, whatever that may mean. The histologic picture is essentially the same as the one a colleague of Dr. Jaffe's, Lichtenstein,<sup>2</sup> has described in a number of cases presenting the syndrome that Dr. Fuller Albright<sup>3</sup> has made familiar to all of us.

DR. HAMPTON: Was there any evidence of inflammation?

DR. MALLORY: Not the slightest. The patient was not worked up as thoroughly as might have been desired, either preoperatively or postoperatively, but so far as is known she had no lesion in other bones and left the hospital perfectly well.

DR. GEORGE W. HOLMES: Could this be related to subchondral necrosis? It is pretty close to that region of the tibia.

DR. MALLORY: At the time of examination there was no evidence of necrosis, but that does not rule out the possibility that there may have been some in the past.



DR. HOLMES Your pathological description sounds very much like the subchondromal necrosis of Pick or osteochondritis

DR. MALLORY I feel so relatively unfamiliar with that condition that I do not believe I can rule it out with certainty, although it does not correspond to my impression of osteochondritis

DR. SIMMONS The pathologic picture would not fit in with von Recklinghausen's disease or subperiosteal neurofibromatosis<sup>3</sup>

DR. MALLORY Again I cannot answer I see no reason why a primary fibroma occurring within the bone might not show foci of ossification It is conceivable that that might be the situation here

DR. HAMPTON It would not show a dense margin in the bone defect. I cannot imagine a benign lesion in the bone that would produce an area of new bone, 2 cm in width, around it. Pressure necrosis is not like that This bone defect has a very definite margin, a thick margin, much thicker than the cysts in Albright's disease I cannot conceive of a tumor producing this picture Can you, Dr. Holmes?

DR. HOLMES No

DR. MALLORY Our thought on the whole was that it probably was not neoplasm, but we have not the slightest idea what is back of it It certainly appears to be a benign lesion, and I have no doubt she is cured

DR. GRANTLEY TAYLOR I should like to know about the Hinton test in bone syphilis

DR. MALLORY Without having looked the matter up I should be inclined to differ with Dr. Simmons on that, and say that the Hinton test is usually positive in bone syphilis, although I have seen cases in which the Hinton test was negative and the Wassermann positive There is a slight danger in regard to the Hinton test it is so sensitive that there is occasionally a pre-zone phenomenon, just as in the Widal reaction, and a negative reading is obtained in a case which really is too strongly positive to show

DR. SIMMONS I might say that I was quoting the late Dr. C. Morton Smith when I made the statement

DR. FULLER ALBRIGHT Why is this not a Brodie's abscess?

DR. MALLORY Because it shows no trace of inflammation I find it hard to believe that an infectious lesion of the bone could heal and not leave behind even a lymphocyte

DR. ALBRIGHT I should think it could in time

DR. HAMPTON She had clinical evidence of inflammation, and it seems as though the lesion should have been inflammatory

DR. SIMMONS Could it not have been a bursa?

DR. MALLORY Nothing is said in the operative note about a bursa

DR. SIMMONS No, but it might have quieted down

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## CASE 25072

### PRESENTATION OF CASE

An eighteen-year-old girl was admitted complaining of swelling above the right elbow

About eight weeks before entry she first noted a lump deep in her right upper arm just above the elbow It was not tender or painful and had not changed in size She consulted a physician, following which fifteen doses of x-ray therapy were given over the area The treatment blanched the skin but did not change the size of the tumor She had had no other symptoms

About eleven weeks before admission, during the New England hurricane, she received lacerations of the head and left leg, but remembers no injury or pain involving the right arm The swelling had interfered in no way with the use of the arm The past history and family history were noncontributory

Physical examination showed a well-developed and nourished girl in no distress The general physical examination was negative except that the skin showed acne over the face, back and chest The blood pressure was 115 systolic, 60 diastolic There was a 4 by 5 cm swelling involving the right humerus just above the elbow The skin over this area was mottled and depigmented No axillary nodes could be made out

The temperature was 98.6°F, the pulse 90, and respirations 20

Examination of the urine was negative. The blood had a serum-calcium of 11.1 mg per cent, a phosphorus of 4.2 mg per cent, and a phosphatase of 38 units

Films brought in by the patient, taken before x-ray treatment, showed an area of destruction with ill-defined margins, involving the lateral cortex of the lower end of the right humerus (Fig. 1) This defect was about 4 cm in length, and there was no new bone formation or calcification within the soft tissues The soft-tissue mass was about 5 cm in diameter It was not present at the site of bone destruction The films

taken on admission showed a sharply defined concave defect in the lower end of the right humerus, measuring 4 cm in length and 1 cm in depth (Fig 2) Opposite this defect there was a thin shallow bone which at each end was continuous with the periosteum This shallow bone

phosphorus and phosphatase were all within normal limits The only other relevant preoperative information was contributed by the x-ray films, and I think we might see them before we go farther

In the original film there is no evidence of repair, regenerative activity or encapsulation and we are dealing simply with an area of destruction chiefly confined to the cortical bone Dr Simmons presented in his discussion of the previous case the main pathological categories which we present to ourselves in an attempt to arrive at a diagnosis The constitutional and systemic diseases, of which hyperparathyroidism is a type, usually give some indication by x-ray of the presence of other bone lesions, or betray their pres-

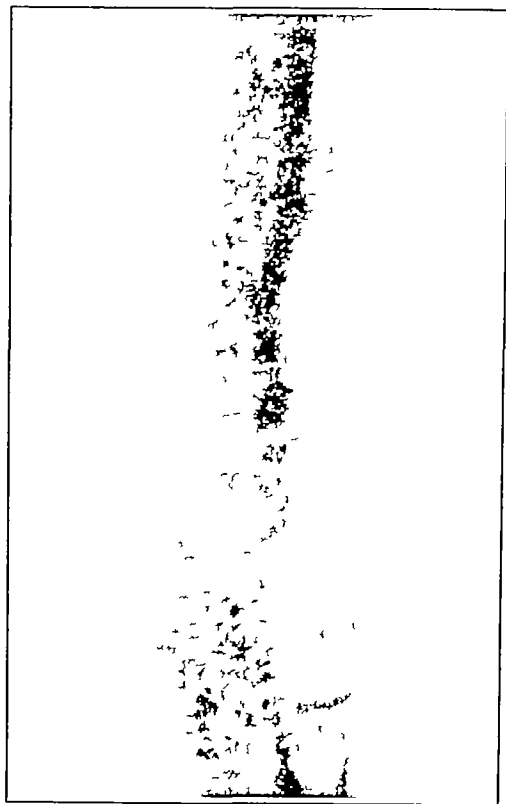


Figure 1 X-Ray Film before Treatment

appeared to be intact in both views There was elevation of the periosteum for about 1 cm

The patient's chart remained normal On the third hospital day an operation was performed

#### DIFFERENTIAL DIAGNOSIS

DR GRANTLEY W TAYLOR An eighteen-year-old girl presented in her arm just above the elbow a mass of eight weeks' duration, which was not tender or painful She had received a course of fifteen x-ray treatments before she came to the hospital, so that presumably a diagnosis had been made I do not know, but I infer that the treatment did not affect the lesion This was essentially a symptomless mass, and the only findings on physical examination that were relevant were the presence of a mass and some skin changes in the vicinity, which I should say were probably attributable to the x-ray treatments she had had The skin in the area was mottled and depigmented The laboratory work was essentially noncontributory The chart was flat and the serum calcium,



Figure 2 X-Ray Film After Treatment

ence by abnormal chemical findings in the blood Reviewing the inflammatory conditions we have osteomyelitis, syphilis, tuberculosis and a few extremely rare diseases We have nothing in the data at present to justify the assumption that any one of these is present, and we are brought to the fact that we are dealing with a tumor

The question arises as to whether this is primary or metastatic tumor, and again we have nothing in the record as presented to give us any cause to suppose we are dealing with metastatic malignancy Of the primary tumors we can be

concerned with a benign or a malignant lesion. To my mind the character of the x-ray film as shown here in no way suggests a benign lesion. The defect is very irregular. Around its margins there is nothing suggesting the lobulations of a chondroma. I think that we are entitled to rule out chondroma or osteoma, giant-cell tumor, and so forth, on the basis of this x-ray appearance, and we are brought to the conclusion that we are dealing with a malignant tumor. I do not believe that we are justified in limiting ourselves wholly to a Ewing's tumor and to osteogenic sarcoma in this differential diagnosis. Parker and Jackson\* have recently described reticulum-cell sarcoma as a tumor of bone.

Are there other tumors to which we need to give thought? When I read this description I could not be sure that we were not dealing with a lesion like a single myeloma, which sometimes occurs and presents a confusing picture. However, this lesion is so clearly cortical that I do not believe we can relate it in any way to a disease which is primary in the bone marrow.

The reaction to x-ray treatments is of a good deal of interest. I wonder whether we can say that this ring of bone reaction outside the tumor might have been present originally but that through some technical error in the way the film was taken it failed to show up, I do not picture that type of reaction as an immediate consequence to a series of x-ray treatments. This film shows a rather narrow ring of periosteal bone, with a vague hint of trabeculation on its inner border, and to my mind it raises the question of some sort of bone cyst. I do not know of any sort of bone cyst which would develop in the periosteum in that fashion. I think if we were dealing with a subperiosteal chronic osteomyelitis we should have more suggestion of reactive new bone on the side of the shaft. If we had such a reaction this picture would be consistent with chronic inflammation. The margins of the defect certainly are very ragged in the original film, and in this one quite smooth, which indicates that there has been a distinct effect on the pathologic process as a result of the x-ray and a tendency for bone repair to take place. Now what sort of tumor will respond to fairly extensive x-ray treatment—Dr Hampton tells me the total dose was about 4000 r. Conspicuously, a Ewing's tumor responds very well to radiation treatment, as does a myeloma or a reticulum-cell sarcoma. However, the x-ray appearance rules out myeloma. I believe that either a reticulum-cell sarcoma or a Ewing's tumor would be perfectly consistent with all the information

that we have in this case. I should like to have Dr Holmes present his views of the x-rays.

DR. GEORGE W. HOLMES: I know the answer. However, I think it might be interesting if I reviewed my own reaction to this case.

I first heard of this patient through a letter and films from a doctor in Vermont who had the case originally. I had the history about as it has been given and this set of films, with the statement that the patient's parents had refused operation. They would permit a biopsy, but the doctor very wisely refused to do it without permission to operate, so he sent the films to me with the question as to whether she ought to have x-ray treatment. I said at that time, reasoning very much as Dr Taylor did up to that point, that it could not be a benign tumor and probably was malignant. The patient's other bones were x-rayed and carefully studied for the possibility of a metastatic lesion. I finally came down to the only seemingly possible diagnosis—a primary malignant lesion of bone. I thought treatment was justified so he went ahead and treated her. Then after the treatment was completed they sent her down for a consultation because the family was getting anxious. Dr Simmons and I saw her, and we could not explain the x-ray picture taken at that time on the basis of x-ray effect. My impression was that the separation of the periosteum from the shaft did not develop during the interval but merely became visible and that the separation of periosteum from shaft was present but not visible at the time of the first examination. I doubt if the deposit of calcium had anything to do with the x-ray treatment, it is the natural course of events with separation of the periosteum.

DR. TAYLOR: Do you believe that the tendency of the shaft side to smooth itself was attributable to the same reaction?

DR. HOLMES: I think that the irregularity was due to the same thing that separated the periosteum from the shaft.

DR. TAYLOR: In the first film it looks rougher than in the others.

DR. HOLMES: I agree.

DR. TAYLOR: What I have been attributing to the result of x-ray treatment is apparently only attributable to the passage of time. What would give rise to the elevation of periosteum—which must have taken place at the time of the original plates—so recently as not to have shown reaction? Is trauma a possible explanation? She was injured in the hurricane, but so far as I can make out the head and the legs suffered whereas the rest of the body did not. Perhaps she had been so confused with the bump on the head that she was

\*Parker F. Jr. and Jackson H. Jr. Primary reticulum cell sarcoma of bone. Surg. Gynec. & Obst. 68:45-53, 1939.

not aware of an injury of the arm. Could a subperiosteal hemorrhage account for the picture? I still do not believe that the shaft should be as irregular as it appears to be from subperiosteal hemorrhage. I am completely at a loss in the matter of making a diagnosis. I still have the impression that perhaps it was a malignant bone tumor, such as a Ewing's tumor, but I say this without any great confidence.

DR. TRACY B. MALLORY: I think that Dr. Taylor has shown wisdom in not committing himself to a definite diagnosis.

DR. CHANNING C. SIMMONS: I might add that this girl was seen by an eminent orthopedic surgeon in this city and one in New York, both of whom made a diagnosis of malignant tumor and advised against operation because they believed it to be incurable. Dr. Ernest A. Codman saw these films and thought it was probably a benign tumor, actual type unknown. He agreed that it might be malignant. I thought it was probably a malignant tumor, type unknown, but did not dismiss the possibility of its being benign. That is as far as anyone got. Since then I have seen a paper describing subperiosteal bone cysts in von Recklinghausen's disease. So far as I could determine she had no evidence of subcutaneous nodules, pigmented areas in the skin or other forms of that disease.

DR. MALLORY: Will you describe your operative findings?

DR. SIMMONS: At operation a subperiosteal cyst containing clear brown fluid was found. The outer wall was composed of fibrous tissue and periosteum with areas of calcification and the inner wall of normal appearing cortical bone. The entire outer wall of the cyst was removed, allowing the muscle to come in contact with the normal appearing bone.

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Sarcoma, right humerus?

Benign bone tumor, right humerus?

#### DR. TAYLOR'S DIAGNOSIS

Ewing's tumor, right humerus?

#### ANATOMICAL DIAGNOSIS

Bone cyst, etiology undetermined

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: The microscopic examination of the wall of the cyst showed fibrous tissue and a moderate number of foreign-body giant cells, with no evidence of neoplasm, so that the diagnosis remains bone cyst, etiology unknown.

DR. TAYLOR: Is this a possible sequela to trauma with hematoma?

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A PHYSICIAN: Did the x-ray treatment have any effect?

DR. SIMMONS: None at all. Presumably that was done at the psychological moment after the acute reaction had subsided and before the secondary fibrotic changes had taken place.

A PHYSICIAN: Was the wall of the cyst enucleated?

DR. SIMMONS: No, there was no capsule. The outer wall was composed of periosteum with bone in it.

DR. AUBREY O. HAMPTON: The thing I object to is accepting a pathologist's diagnosis in regard to something that is past. How does he know what was here first?

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DR. TAYLOR: Do you want to offer a suggestion as to what was there?

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DR. MALLORY: I believe this girl is going to remain well.

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## CONVALESCENCE

CONVALESCENT care is relatively neglected in the United States. Its importance in the restoration of health does not seem to be properly appreciated by physicians, otherwise there would be greater demand for facilities to care for convalescent patients.

Several pleas have been made in the past that more interest be taken in convalescence, but relatively little progress has been made. A new challenge is at hand—a report of a study of convalescence undertaken by an Advisory Committee on Convalescence of the Boston Council of Social Agencies under the leadership of Miss Ida M. Cannon.<sup>1</sup> In this report it is estimated that 12,000 patients from the wards and outpatient departments of Boston hospitals need convalescent care

annually, but in 1937 only 2500 were known to have received it, and a large proportion of these were children for whom facilities are far more adequate than those for adults. There are only three chartered institutions for adult convalescent care in Boston, with a total of 96 beds, of these only 10 are for men and all are for ambulatory patients. In spite of these small facilities none of the institutions are used to full capacity. Although several factors are involved, the chief reason for this seems to be that the profession is not sufficiently interested in convalescence. For economic and emotional reasons a patient is apt to resist a suggestion that two or three weeks be spent at a convalescent home, so that the demand for beds for convalescent patients must be created by the physician. Yet convalescence is not a very interesting subject to the average doctor, and often is given little consideration by those in charge of patients in large hospitals—a group of individuals who particularly need institutional convalescent care.

Undoubtedly fatigue, in one form or another, is a major symptom of a large number of individuals. The role played by so-called mental or physical fatigue, and by altered physiologic states that cause individuals to note they feel fatigued, in the development of disease is not well understood, but undoubtedly fatigue greatly influences the onset and the intensification of many disorders of man. A significant amount of illness could probably be prevented by a proper appreciation of the danger signal—fatigue—and by intensively treating individuals who complain of it. This can often be done successfully in places designed for convalescent patients and especially when the patient's home is unsuitable for the purpose.

The contrast between facilities for convalescent individuals in Great Britain and the United States is indeed striking.<sup>2</sup> In Great Britain there existed, in 1935, 431 homes for convalescent care as against 179 in the United States chartered as such. In Great Britain they are widely distributed, whereas here there are twenty-four states without any facilities, and 50 per cent of the beds are near

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New York City The British homes are used to capacity, 252,000 people receiving care in a year, and during the depression the facilities were uncurtailed, indicating the importance with which they are regarded In Boston the institutions for convalescent patients connected with three large hospitals have been closed, chiefly for reasons of economy But would it not be possible that much expense to a general hospital could be saved by transferring many patients to a department for convalescent care before they are well enough to be sent home but after they are past the acute phase of illness? At the present time many recumbent convalescent patients are being cared for in nursing homes—some good, some poor, but all unlicensed and unsupervised

A committee of the Hospital Council of Boston has just been established to study the recommendations of Miss Cannon's committee It is to be hoped that a program for the meticulous care of patients during convalescence will be forthcoming

#### REFERENCES

- 1 Cannon I M *Facilities for Convalescent Care in Boston* Boston Research Bureau Boston Council of Social Agencies 1938
- 2 Gardiner E G *Convalescent Care in Great Britain* Social Service Monographs No 34 Chicago University of Chicago Press 1935

### A COMMENDABLE PLAN

AMONG the many sociologic and economic programs under way and in contemplation throughout this country those pertaining to medical service are being studied and operated under a great variety of plans This situation has come about because of an awakened appreciation of the importance of utilizing all useful devices and agencies which may promote the efficiency of scientific medicine

While differences of opinion respecting some of the plans exist, there is a common belief that every community should have the resources of a hospital available for such cases as may need extra-domiciliary treatment This applies to a large pro-

portion of accidents, to surgical operations and to facilities for diagnosis and certain highly specialized forms of treatment Medicine today is, in many ways, a science depending on the services of qualified technicians with elaborate chemical and mechanical facilities at hand for the diagnostician, be he either surgeon or internist

With this understanding, hospitals have been built in comparatively small municipalities and, when well administered, have been blessings for such communities These hospitals are rarely self supporting and have been maintained by endowments or contributions of public-spirited citizens Present financial conditions warrant the fear that the small community voluntary hospital will not be able to meet the requirements of advancing scientific medicine and that the growing proportion of well-educated doctors will not be satisfied with hospital facilities below the standards to which they have been accustomed in their intern days

It is desirable to keep these small hospitals well above the grade of nursing homes A step in the right direction is the agreement recently put into effect by the Salem Hospital and the Mary Alley Hospital in Marblehead, whereby the equipment and facilities of the larger institution are made available for the hospital and physician of the smaller community

This plan seems to be a feasible solution of the problems confronting the small hospitals, for it makes possible a service practically identical with that of an institution prepared to meet almost all the demands imposed on or incident to the practice of scientific medicine Probably a survey throughout Massachusetts and other states will disclose communities with conditions similar to those in Salem and Marblehead, where the plan outlined might be advantageously adopted

We congratulate these two communities for their evidence of a broad-minded spirit of collaboration which will, we believe, be a pattern for similar experiments



## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## POSTPARTUM HEMORRHAGE

Mrs M. M., a twenty-nine-year-old primipara at term, entered the hospital early in the morning of February 5, 1925, the membranes having ruptured.

Her family history was noncontributory. The patient gave a history of Vincent's angina, measles and influenza. She had had no operations. Catamenia began at twelve, were regular with a twenty-eight-day cycle and lasted four to five days, with little pain. Her last period was April 28, 1924, making her due for confinement February 1.

She was first seen on June 20, 1924, at which time her heart was rapid but there were no murmurs. Her lungs were clear and resonant, there were no rales. Her blood pressure was 136 systolic, 64 diastolic. A vaginal examination showed the cervix deep in the vagina and soft. The uterus was anterior. Her pregnancy progressed normally until the date of entry.

The patient continued to lose a little amniotic fluid all February 5 and started in indefinite labor about midnight. At 9 a. m. on February 6 the contractions were beginning to come regularly about every three minutes. Examination showed the cervix dilated to admit two fingers and thin, and the head well in the pelvis. At 11 a. m. the cervix was dilated to admit four fingers. At 1 p. m. a forceps was applied to a rotated ODP, after a median episiotomy because of the lack of progress. A male child in excellent condition and weighing 8½ pounds was delivered. The placenta apparently separated immediately but was not extruded. The fundus was not held properly, and a half hour after delivery it was well above the umbilicus. After the placenta, with membranes complete, was delivered intact, by the Credé method, a clot the size of a baby's head followed. Oxytocics were administered, but the uterus did not contract until the pulse had risen to 160 and the blood pressure had dropped to 90 systolic. The patient was transfused with 450 cc of citrated blood taken from a compatible donor. She made an uneventful convalescence and was dis-

charged from the hospital eighteen days after delivery.

*Comment* There is no explanation for the atony that accompanied this delivery except that the fundus was not held properly after delivery. If it had been, it would have been appreciated that the uterus was rising and one would have known that it was filling with blood. Then the placenta might have been delivered before so much blood had been lost. This uterus was not explored because oxytocics and transfusion eventually effected normal contraction. It has been found in many of these cases of hemorrhage that transfusion not only quickly replaces the lost blood but stimulates the uterine muscles to contract.

MEDICAL POSTGRADUATE  
EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning February 20.

## BRISTOL NORTH

Thursday, February 23, at 4 00 p. m., at the Morton Hospital, Taunton. Subject—Heart Disease. The treatment of 'heart attacks or cardiovascular emergencies.' Instructor: Sylvester McGinn Lester E. Butler, *Chairman*.

## BRISTOL SOUTH (Fall River Section)

Tuesday, February 21, at 4 00 p. m., at the Union Hospital, Fall River. Subject—Medical Complications in Pregnancy. Instructor: James C. Janney. Howard P. Sawyer, *Chairman*.

## MIDDLESEX EAST

Tuesday, February 21, at 4 00 p. m., at the Melrose Hospital (Colby Hall), Melrose. Subject—The Indications and Contraindications for Removal of Tonsils and Adenoids. Instructor: Edwin T. Wyman. Walter H. Flanders, *Chairman*.

## MIDDLESEX NORTH

Thursday, February 23, at 4 30 p. m., at St. John's Hospital, Lowell. Subject—Syphilis. Latent syphilis—diagnosis and treatment. Instructor: Rudolph Jacoby. William S. Lawler, *Chairman*.

## HEART DISEASE VERSUS HEART FAILURE\*

The title of this talk, Heart Disease versus Heart Failure, was chosen in order to point out that heart disease does not necessarily imply heart failure. The term heart disease signifies that some of the working parts of the heart have been damaged, while heart failure signifies that the heart is unable to do its job as it should be done.

The fact that a person has a structural deformity of his heart does not necessarily signify that he is seriously sick or that his life is in danger. Much of the important work

\* A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

\* Green Lights to Health—broadcast given by Dr. Herrman L. Blumgart on Wednesday January 18 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

in the world is accomplished by people with heart disease. To use the example of the automobile, there may be knocks and squeaks in the engine, but used carefully and skillfully, it may provide entirely adequate service to its owner for many years and may actually survive many more smoothly running engines recklessly run and abused. Every physician sees numerous individuals who are heart cripples, not because of a structural deformity of the heart, but because fear and anxiety have paralyzed the patient. Such patients would lead happy and useful lives if they knew how many individuals beyond seventy show evidences of heart disease which have been present but caused no trouble for thirty, forty or even fifty years. As Osler remarked "The way to live forever is to acquire a chronic disease and take care of it.

Of the infections which damage the heart, the worst enemies are rheumatic fever, syphilis and occasionally certain acute infections such as diphtheria, scarlet fever, tonsillitis, pneumonia and gonorrhea. The natural wear and tear of old age, which in present-day life frequently occurs before it should in the middle years, causes hardening and narrowing of the arteries which supply the heart with blood. This leads to weakness or even failure of the muscular power of this organ. Of the various infectious diseases, rheumatic fever is first in importance. Most frequently it afflicts children, usually after the age of five, and young adults. This disease often comes on with tonsillitis, and there are likely to be migrating pains in the joints and muscles, wrongly called growing pains, and sometimes redness, tenderness and swelling of various joints, nosebleeds, fever and malnutrition. This infection may cause weakening of the heart muscle and may permanently scar and distort the valves of the heart. In middle adult life we find not only those who have suffered from rheumatic fever, but those who, having had syphilis in earlier years, have felt so well that they have disregarded treatment of the disease, or may not even have known that they had syphilis. During the years of neglect, the infection may silently cause destruction of the root of the large vessel leading from the left pumping chamber and of the heart valve lying very near it. The individual may feel perfectly well for many years until he suddenly becomes aware of symptoms such as loss of breath, pain, palpitation and weakness. The treatment of such patients is discouragingly unsatisfactory, compared to the striking curative value of modern remedies in the early stages of the disease.

Pain may be an important warning sign of disease of the heart. Not infrequently, however, the patient may describe his symptoms as a vague sense of oppression below the breast bone or as a dull, heavy sensation in the shoulders or arms brought on by exertion, emotion, overeating or exposure to cold. One should remember, however, that other organs such as the skin, muscles, ribs and lungs are also situated within the chest and may give rise to similar deceiving symptoms even when there is no real heart disease. Pain in these places may also be due to irritation of nerves or even to diseases of the stomach and gall bladder. On the other hand, symptoms arising in the heart may be felt only in a distant area such as the fingers, the shoulders or the upper part of the abdomen, or may give rise to belching or burning sensations. In any event, such symptoms, particularly when they occur in people of middle age, should make a person consult his physician, for not only may heart disease be suggested by symptoms in other parts of the body, but diseases elsewhere may be discovered because of sensations felt in the region of the heart.

The causes of cardiac pain are numerous, but almost all have to do with interference with the blood supply to the

heart muscle. With hardening and narrowing of the arteries of the heart, the amount of blood which can be pumped through these vessels may be enough while a person is resting, though not enough to take care of the increased amount of work the heart is forced to do during exercise or emotion. The appearance of such pain should be regarded by the patient as a red light or danger signal which, if heeded, will prevent an accident, but which, if neglected, may lead to disaster. People who take care not to work too hard or get excited, which may bring on such attacks, and who can lead a quiet, peaceful life, often live for many decades. Sometimes one of the arteries may be completely blocked and give rise to severe, crushing pressure or pain. The heart muscle supplied by such a vessel then degenerates. Even then, after a part of the heart is out of commission, the rest of the heart may be able to take on the job of the injured part, and people have been known to live comfortably for twenty or thirty years after a heart accident of this sort.

Many people with heart disease who try to live more strenuously than is wise for the condition of their hearts have signs of heart failure. The inability of the heart to pump a sufficient amount of blood in a forward direction causes a backing up of blood in the veins and then congestion of the various organs, skin and underlying tissue takes place. Breathlessness, chronic cough with whitish or pinkish sputum, congestion of the liver, giving rise to pain in the upper right portion of the abdomen, swelling of the legs and inability to lie flat in bed are frequently due to heart weakness. By giving the heart sufficient rest, being quiet in bed, and by the skillful use of drugs made possible by the extraordinary advances in scientific medical knowledge, these signs of failure usually disappear. Such people may lead full, happy and successful lives, particularly by giving the heart less work to do, by cutting down bodily activity, by getting enough sleep and rest, by a slowing down of pulse and by loss of weight. Taking digitalis and certain other drugs which remove the accumulations of fluid is an important aid in treatment. Extraordinary advances have also been made in the treatment of heart disease by means of surgery. In spite of the fact that the heart is very sensitive to injury and is situated within the bony cage of the chest, removal of accumulations of fluid surrounding the heart can be accomplished with safety. In certain forms of heart disease the heart becomes surrounded by a tough fibrous sac which interferes with normal pumping. Surgeons are now able to enter the chest and release the heart from this tight, almost bony, envelope. The injection of nerves by alcohol to relieve the pain of what is called angina pectoris and the removal of the thyroid gland to lessen the work of the heart are other surgical procedures by which increased comfort and long life may be provided for certain cases.

\* \* \*

Q Does the occurrence of a very rapid pulse or palpitation suggest the presence of heart disease?

A Palpitation, one of the commonest symptoms of heart disease, means a consciousness of the heart beat. Palpitation due to increased rate of contraction may be caused by disease elsewhere, such as too much action of the thyroid gland. This symptom, of course, also comes on in health, with emotion or strenuous exercise, or even on lying down in bed on the left side in the quiet of the night. Some people have occasional extra beats of the heart throughout their life, feeling a skipping of the heart. This irregularity is due to the play of nervous impulses, and some people have noticed this from early life to a ripe old age, without its causing any further difficul

ty Occasionally, however, and particularly when this irregularity of the heart beat appears for the first time in middle life, it may be a warning sign of some structural abnormality or an increased irritability due, perhaps, to excessive smoking. Another sign of the 'nervous heart' may be paroxysms of rapid heart action. The individual, without warning, suddenly experiences an extraordinary pounding of the heart which may last for minutes, hours or even days. Such attacks, which are most disconcerting, are not dangerous and fortunately the physician has effective remedies with which to stop and to prevent them. It is a great tribute to the heart that in spite of such overwork it does not wear out during such an attack or suffer any lasting damage. Nevertheless, people should not disregard such disorders of the heart beat, but rather allow a physician to investigate and explain what they mean.

Q If a patient has heart disease, what can be done to prevent heart failure?

A. Once heart disease has come on, there is often a considerable period of time before it produces any important interference with the function of the heart. During this period in which there are no symptoms, the problem of the physician and the patient is to prolong this period of perfect well-being and prevent the onset of heart failure. To do this, the physician attempts not only to control the original causes of heart disease but also to treat other conditions which, while not enough in themselves to cause heart failure, may bring about heart failure in an already diseased heart. These conditions include acute infections, overwork, emotional strain, obesity, too little or improper food, anemia, pregnancy and thyroid disease.

Q Is it bad to be fat if you have heart disease?

A. The longer the belt line, the shorter the life line. High blood pressure is over two and a half times as common among the overweight as among those of average weight, and the death rate from heart disease and cerebral hemorrhage is one and a half times that of those with normal weight and nearly twice that of underweights.

For angina pectoris the difference is even larger. The mortality of overweight from this condition is more than twice that of those with average weights and two and a half times that of underweights. It is clear then that great gains in individual and community health could be brought about if we could cut down the number of fat people.

Q Has any progress been made in the prevention of heart disease?

A. While great advances have been made in the diagnosis and treatment of heart disease, even more important progress has been made in regard to the prevention of heart disease. Diphtheria, once so prevalent, is now successfully controlled. The causative agent of rheumatic fever is unknown, but it is recognized that overcrowded living conditions, poor nutrition and neglected infections particularly of the teeth and tonsils, make children more likely to have rheumatic fever. The rising standards of living and more adequate medical care have led to a real lessening in the number of cases of rheumatic heart disease.

The scientific advances in medicine are nowhere better seen than in our knowledge of syphilis. The infecting organism has been discovered, the different ways by which the disease is passed on are recognized, the clinical manifestations of the disease are accurately known, exact diagnostic tests are available, and effective methods of treatment have been worked out. This information, together with the present public health campaign, should lead to a great reduction in syphilitic heart disease.

Q Is heart disease increasing?

A. In spite of such progress, an alarming increase in the occurrence of heart disease has been reported by many observers. There are today probably over two million people in this country suffering from some type of heart disease, and statistics seem to show that the death of one of every seven of us will be caused by disability of the heart. Heart disease as the cause of death is more frequent than cancer, pneumonia and tuberculosis combined.

Q Is this increase of heart disease something to worry about?

A. Careful study of these statistics is reassuring, however, rather than, as is usually thought, a ground for serious worry. Great progress has been made in the prevention and treatment of tuberculosis and the treatment of diabetes and the diseases of infancy and childhood. The effective control of these diseases, improved sanitation and other successful public health measures have led even during the past twenty five years to an increased life expectancy of fifteen years. Many people who formerly died of diabetes or died from one of the infectious diseases of childhood attain old age with its tendency toward hardening of the arteries and consequent heart disease. The increase in heart disease is therefore due to the fact that heart disease is mainly a disease of the older years and that over 60 per cent of all deaths now occur after the age of forty five.

Q What is coronary thrombosis?

A. Coronary thrombosis is a condition in which one of the arteries which supplies the heart with blood becomes plugged with a firm clot of blood.

Q Can anything be done to prevent the accident of coronary thrombosis?

A. If people find that they have to cut down on exercise, if they have attacks of pain in their chest and shortness of breath, then they should be kept very quiet so that, if a clot of blood occurs, nature will have a chance to form other blood vessels to take the place of the plugged one. Avoid strenuous physical effort and emotional excitement which, with its attendant increased blood pressure, leads to a greatly increased strain on the heart.

Q Does physical activity immediately after severe pain affect the amount of damage to the heart muscle?

A. Our latest knowledge indicates that it certainly does. Tying off a blood vessel in dogs causes a larger area of damage in those which are allowed to exercise afterward than it does in those which are kept quiet. Exercising muscle (and the heart is a muscle) requires more oxygen and therefore a larger blood supply than a resting one. This is in keeping with the accumulated experience of doctors.

If every patient suddenly stricken with severe crushing pain were to lie down, there would probably be a decrease in the number of deaths from the disease. If patients followed their doctor's advice and remained at absolute rest in bed for a sufficient time, some deaths and much in capacity would be avoided.

Q What is the length of time a patient should stay in bed?

A. Healing time is variable—let us say three to eight weeks. Mental and physical rest speeds up the healing process. Eating increases the work of the heart by 50 per cent, and therefore the diet should be light and the patient, if fat, should lose weight.

\* \* \*

Don't worry about heart disease, but if you think you have it, see your doctor and let him tell you what to do, which may very likely be, to stop worrying.

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## NOTICES

### REMOVAL

HENRY M BAKER, M.D., announces the removal of his office to 353 Commonwealth Avenue, Boston.

### HOSPITAL RESEARCH COUNCIL

The Hospital Research Council will hold a meeting in the Ether Dome of the Massachusetts General Hospital on Tuesday, February 28, at 5 00 p m The program will be as follows

#### STUDIES PERTAINING TO THE PHYSIOLOGY OF NORMAL JOINTS

The Origin and Nature of Normal Synovial Fluid  
Dr Marian W Ropes

The Removal of Proteins and Aqueous Solutions from Normal Joints Dr Walter Bauer

The Passage of Proteins and Pneumococci from the Vascular System into Joints Dr Granville A Bennett.

The Relation of These Studies to the Metabolism of Cartilage. Dr Eric G L Bywaters

HENRY K. BEECHER, M.D., *Secretary*

### SALEM HOSPITAL CONFERENCES

There will be conferences at the Salem Hospital every Friday morning at 9 00 until further notice. Physicians are cordially invited to attend

The form of the conferences for each month will be as follows

- First Friday—Grand ward rounds
- Second " —Clinicopathological conference
- Third " —Grand ward rounds
- Fourth " —Clinical conference.

If there is a fifth Friday in any month, there will be either grand ward rounds or a tumor-clinic teaching conference

### SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, February 21, at 12 o'clock noon.

Dr Howard F Root will speak on "Hypertension and Its Complications"

Physicians are cordially invited to attend.

JOHN B HALL, M.D., *Secretary*

### CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in the Andrew Carney Assembly Room on Monday, February 20, at 11 30 a. m

#### PROGRAM

##### Case reports

Infections of the Foot Usual anatomical locations and treatment. Dr John G Arent Discussion by Drs Archibald McK Fraser, John L Doherty and John J Todd.

Physicians and medical students are cordially invited to attend

ROY J HEFFERNAN, M.D., *Secretary*

### MASSACHUSETTS ITALIAN MEDICAL SOCIETY

The regular monthly meeting of the Massachusetts Italian Medical Society will be held at the Hotel Kenmore, Boston, on Friday evening, February 24, at 9 00

#### PROGRAM

Pathology of Peptic Ulcer Dr Marino F Vidoli  
Sociomedical Problems in Italy Marquis Carlo De Constantin de Chateauneuf, Italian Consul General of New England

A general discussion will follow The medical and allied professions are cordially invited to attend.

CARL F MARALDI, M.D., *Secretary*

### CAMBRIDGE HOSPITAL

The regular clinicopathological meeting of the staff of the Cambridge Hospital will be held at the hospital, 330 Mt. Auburn Street, Cambridge, on Tuesday, February 21, at 8 30 p m.

Dr Elliott C Cutler will speak on "Surgical Treatment of Peptic Ulcer"

All members of the medical profession are cordially invited to attend

STEPHEN M BIDDLE, M.D., *Secretary*

### NORFOLK DISTRICT MEDICAL SOCIETY

The regular meeting of the Norfolk District Medical Society will be held in the Hotel Somerset, Boston, Tuesday evening, February 28, at 8 30 Tel KEN 2700

#### PROGRAM

The Huntington Hospital and the Cancer Problem.  
Dr Joseph C Aub

Kodachrome Views of Contagious Disease. Dr Edwin H Place

Collation.

FRANK S CRUICKSHANK, M.D., *Secretary*

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, February 23, in the amphitheater of the Peter Bent Brigham Hospital, Dr Marshall N Fulton, associate in medicine, Harvard Medical School, and physician, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend

### BOSTON MEDICAL HISTORY CLUB

The Boston Medical History Club will meet at the Boston Medical Library, 8 Fenway, Boston, on Monday evening, February 20, at 8 15

Dr Leroy M S Miner will talk on "The Development of Our Knowledge of the Diseases of the Teeth"

Members of the medical profession and other interested persons are cordially invited to attend

PAUL D WHITE, M.D., *President*  
BENJAMIN SPECTOR, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, FEBRUARY 20

## MONDAY FEBRUARY 20

- \*11.30 a. m. Carney Hospital Monthly clinical meeting and luncheon.
- \*8.15 p. m. Boston Medical History Club Boston Medical Library 3 Fenway

## TUESDAY FEBRUARY 21

- 9-10 a. m. Joseph H Pratt Diagnostic Hospital Allergy Clinic with Case Presentation Dr E A Brown.
- \*10 a. m. 12.30 p. m. Tumor clinic Boston Dispensary
- \*12 m. South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue, Boston
- \*8.30 p. m. Cambridge Hospital Clinicopathological meeting of staff

## THURSDAY FEBRUARY 23

- 8.30-9.30 a. m. Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals, held this week at the Children's Hospital Orthopedic.
- \*9-10 a. m. Joseph H Pratt Diagnostic Hospital Medical Social Service case presentation District Service and Social Service staffs
- \*3.30 p. m. Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY FEBRUARY 24

- \*9.10 a. m. Joseph H Pratt Diagnostic Hospital. The Present Status of Specific Therapy for Pneumonia Dr Maxwell Finland
- \*10 a. m. 12.30 p. m. Tumor clinic. Boston Dispensary
- \*9 p. m. Massachusetts Italian Medical Society Hotel Kenmore, Boston

## SATURDAY FEBRUARY 25

- 9.10 a. m. Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a. m. 12 m. Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

## SUNDAY FEBRUARY 26

- 4 p. m. Illustrated, public, health lecture, Faulkner Hospital auditorium Tuberculosis in This Community Dr David Halberstam.
- 4 p. m. Free public lecture Harvard Medical School Amphitheater of Building D Nervous Breakdowns. Dr Vernon P. Williams.

\*Open to the medical profession

FEBRUARY 17—Urological Conference. Massachusetts General Hospital  
FEBRUARY 19—Lecture at the Faulkner Hospital. Page 971 issue of December 15

FEBRUARY 19—Free Public Lecture, Harvard Medical School Page 1056 issue of December 29

FEBRUARY 19—Beverly Hospital Public Health Lecture Page 1056 issue of December 29

FEBRUARY 19—Salem Hospital Public Health Lecture. Page 126 issue of January 19

FEBRUARY 20—Carney Hospital monthly clinical meeting and luncheon Page 312.

FEBRUARY 20—Boston Medical History Club Page 312

FEBRUARY 21—South End Medical Club Page 312

FEBRUARY 21—Cambridge Hospital. Clinicopathological meeting of the staff Page 312.

FEBRUARY 22—Alumni Day New York University College of Medicine. Page 173 issue of January 26

FEBRUARY 23—Medical clinic at the Peter Bent Brigham Hospital Page 312.

FEBRUARY 24—Massachusetts Italian Medical Society Page 312

FEBRUARY 27—New England Heart Association. Page 267 issue of February 9

FEBRUARY 28—Hospital Research Council Page 312.

MARCH 9—Pentucket Association of Physicians 8.30 p. m. Hotel Bartlett, 95 Main Street, Haverhill

MARCH 9.11—New England Hospital Association Page 267 issue of February 9

MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19

MARCH 27.31—American College of Physicians. Page 36 issue of July 7

MAY 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 15-16—American Board of Obstetrics and Gynecology Inc. Page 218 issue of February 2

MAY 15-19—American Medical Association. St. Louis Missouri

JUNE 6, 7, 8—Massachusetts Medical Society Worcester

JUNE 12.17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11.15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24

FALL, 1939—Temperature Symposium. Page 216 issue of February 2

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

MARCH 1—Lynn Hospital Clinic at 5 p. m. Dinner at 7 p. m. Speaker: Dr John Rock Subject Endocrinology

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p. m. Dinner at 7 p. m. Speaker Dr Eiban Allan Brown. Subject Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## NORFOLK DISTRICT

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## SUFFOLK

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8.15 p. m. Program and speakers to be announced

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8.15 p. m. Election of officers Program and speakers to be announced.

## WORCESTER

MARCH 8—Worcester Memorial Hospital

APRIL 12—Worcester Hahnemann Hospital

MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6.30 p. m. which is followed at 7.30 p. m. by the business and scientific sessions.

## BOOKS RECEIVED FOR REVIEW

*Schafer's Essentials of Histology Descriptive and practical for the use of students* H. M. Carleton. 618 pp Philadelphia Lea & Febiger, 1938 \$5.00

*Infections of the Hand A guide to the surgical treatment of acute and chronic suppurative processes in the fingers hand and forearm* Allen B Kanavel Seventh edition. 503 pp Philadelphia Lea & Febiger, 1939 \$6.00

*Sir Thomas Roddick His work in medicine and public life* H. E. MacDermot. 160 pp Toronto The Macmillan Co of Canada, Ltd., 1938 \$2.00

*Principles of Hematology* Russell L. Haden. 348 pp Philadelphia Lea & Febiger, 1939 \$4.50

*The Language of the Dream* Emil A. Gutheil 286 pp New York The Macmillan Co, 1939 \$3.50

*A Textbook of Neuro-Radiology* Cecil P G Wakeley and Alexander Orley 336 pp Baltimore William Wood & Co, 1938 \$8.00

*Alcohol in Moderation and Excess A study of the effects of the use of alcohol on the human system* J. A. Waddell and H. B. Haag 184 pp Richmond The William Byrd Press, Inc., 1938 \$1.00

*Emotions and Bodily Changes A survey of literature on psychosomatic interrelationships 1910-1933* H. Flanders Dunbar Second edition. 601 pp New York Columbia University Press, 1938 \$5.00

*Out of the Running* G. Gertrude Hoopes 158 pp Springfield, Illinois, and Baltimore Charles C. Thomas, 1939 \$2.00

*St. Thomas's Hospital Reports* Edited by O. L. V. S. De Wesselow and C. Max Page, assisted by N. R. Barrett, J. St. C. Elkington and A. J. Wrigley Vol. 3, ser. 2 240 pp London St. Thomas's Hospital, 1938

*Immunity Principles and application in medicine and public health* Hans Zinsser, John F. Enders and LeRoy D. Fothergill. Fifth edition of *Resistance to Infectious Diseases* 801 pp New York The Macmillan Co, 1939 \$6.50

*Midwifery* By ten teachers, under the direction of Clifford White. Edited by Comyns Berkeley, Clifford White and Frank Cook. Sixth edition. 676 pp Baltimore William Wood & Co, 1938 \$6.00

*Petite Chirurgie et Technique Medicale Courante* G Roux 591 pp Paris Masson et Cie, 1938 90 Fr fr

*La Ponction Sterile Procédé de diagnostic cytologique* P Émile-Weil and Suzanne Perlès 183 pp Paris Masson et Cie, 1938 75 Fr fr

*Roentgen Diagnosis of the Extremities and Spine* Albert B Ferguson 435 pp New York Paul B Hoeber, Inc., 1939 \$12.00

*A Medical Survey of the Republic of Guatemala* George C Shattuck. 253 pp Washington, D C Carnegie Institution of Washington, 1938 \$2.50, paper, \$3.00, cloth

*A Manual of Fractures and Dislocations* Barbara B Stimson 214 pp Philadelphia Lea & Febiger, 1939 \$2.75

*The Patient Is the Unit of Practice* Duane W Propst. 219 pp Springfield, Illinois, and Baltimore Charles C Thomas, 1939 \$3.50

*Dunant The story of the Red Cross* Martin Gumpert. 323 pp New York Oxford University Press, 1938 \$2.50

*Body Menders* James Harpole. 296 pp New York Frederick A. Stokes Co., 1939 \$2.75

*Man and His Body* Howard W Haggard. 594 pp New York and London Harper & Brothers, Publishers, 1938 \$4.00

*Surgical Pathology of the Diseases of the Mouth and Jaws* Arthur E Hertzler 248 pp Philadelphia, Montreal and London J B Lippincott Co., 1938 \$5.00

## BOOK REVIEWS

*Our Common Ailment Constipation Its cause and cure* Harold Aaron 192 pp New York Dodge Publishing Co., 1938 \$1.50

It is probably true that informed persons agree with the writer of this book that 10 per cent of the people are more or less constipated and that in a large proportion of these cases the ailment is a functional rather than an organic disease, which may be corrected under intelligent and persistent management. It is, however, too often found that people who should strive for normal behavior of the bowels are impatient and seek relief by taking drugs which tend to establish chronicity. However that may be, Dr Aaron believes that a proper understanding of the causes and treatment of this trouble will be appreciated by those who really want to secure a return to normal conditions. With this in view he expects that many people will be led to profit by his advice.

In order to enable the patient to prevent and cure bad bowel habits the author first gives a description of the anatomy and physiology of the digestive organs. He then discusses the factors that must be considered in order to differentiate organic and functional disease for if the former is confused with the latter dire results are liable to follow. Emphasis on prevention is stressed. This depends in large measure on the recognition of parental responsibility with respect to the education of the child. Adequate space is given to the futility and danger of self-medication, and the approved methods to be employed in bringing about restoration of normal habits are set forth with warnings against harmful drugs and the employment of quacks. Instructive chapters deal with hemorrhoids and colitis.

The book is well written, and there is little opportunity

for criticism, for most of the opinions of the author will be endorsed by well informed physicians. Interspersed in the text the reader will find humor and sarcasm, which tend to emphasize the arguments advanced. Although the book is written especially for the non-medical person there is enough of science to interest those physicians who have not given much attention to this subject. Doctors may recommend this book to their patients with propriety. The only objection to it will come from quacks and manufacturers of proprietary drugs.

*The Physiology of Anesthesia.* Henry K. Beecher 388 pp London, New York and Toronto Oxford University Press, 1938 \$3.75

Dr Beecher approaches the subject as an expert clinical anesthetist, as a teacher of anesthesia and especially as one who has made a thorough study of the physiological basis of the problem in all its varied aspects.

The book begins with a study of the primary effects of anesthesia, namely the effects on the nervous system as a whole. Herein are considered the meaning of anesthesia and narcosis and the various theories of anesthetic action. Next is the section on respiration, in which the chemistry of gaseous exchange, the behavior of the respiratory center, the viscosity of air and the related problems of obstruction of the airway are considered. Next is the section on circulation, in which the effects of various anesthetics on the heart and on other elements in the vascular system are treated. The final chapter deals with "Organic Effects of Anesthetic Agents." This includes a discussion of blood changes—those in the cells, physical properties and blood chemistry—and a consideration of the effects of anesthetics on the liver and other vital organs and finally on metabolic rate and temperature.

This scholarly work should serve a variety of useful purposes. It should be of great value to the medical student learning the foundations of this important subject. It should serve the professional anesthetist, providing timely warnings of the hazards involved in the use of certain anesthetics or in the use of any anesthetics without critical appraisal of danger signs. It should serve the surgeon in like manner, for he, as well as the anesthetist, should understand fully what is involved in the problem which he shares with the anesthetist. If it were not already obvious, this book should furnish convincing evidence of the importance of teamwork between surgeon and anesthetist. The book is also full of significant material for the physiologist. In the discussion of the relation between the chemical properties of the anesthetics and their action on nervous tissue, and in the related consideration of the theories of anesthesia, there are many important clues which may ultimately lead to a better understanding of the nervous system.

*Spinal Anesthesia* Louis H. Maxson. 409 pp Philadelphia, London, New York and Montreal J B Lippincott Co., 1938 \$6.50

This is a very valuable monograph on a most important aid to safe and successful surgery. The writer discusses in detail the development of spinal anesthesia from its earliest days, in its physiological, pharmacological and technical aspects. His own methods of choice are described extensively, with the reasons therefor. Constant comparisons of the ideas and methods of others of authority in this field are made. An excellent bibliography is appended.

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## EXPERIENCES WITH GASTRECTOMY, TOTAL AND SUBTOTAL\*

FRANK H LAHEY, M.D.†

BOSTON

THE following report is presented in the light of certain recent changes in the attitude toward total and subtotal gastrectomy. In the first place, there is more universal acceptance of the belief that gastroenterostomy is not an operation to be routinely applied in the surgical treatment of peptic ulcer. Secondly, it is more generally agreed that subtotal gastrectomy is followed by lower values of gastric acidity, fewer recurrent ulcers, and a better digestive state than results from other less radical surgical procedures. Thirdly, it has been demonstrated by numerous surgeons that patients with seemingly hopeless carcinoma or sarcoma of the stomach can be submitted to total gastrectomy with prolongation of life and possible cure. These things being so, it will be of interest to review some of the experiences we have had and some of the deductions we have drawn in handling 362 cases of subtotal and 9 cases of total gastrectomy. Of the 362 subtotal gastrectomies which we have done, 162 were for cancer and 200 for ulcer.

Up to the present time we have treated in the clinic, under bed management, 3534 patients with ulcer—249 with gastric and 3285 with duodenal ulcers, included in this number have been 115 patients with gastrojejunal ulcers. In order that our attitude toward the surgical treatment of peptic ulcer may be clear, we wish to state that of this entire series only 8 per cent of the patients with duodenal ulcer and but 23 per cent of those with gastric ulcer were submitted to surgery.

The indications for surgery of peptic ulcer, which remain quite unchanged from year to year, are briefly as follows: failure to relieve pain under medical management, perforation, hemorrhage, obstruction and the suggestion of possible malignant degeneration superimposed on a gastric ulcer. We and others have written so much on the question

of indications for surgery in cases of peptic ulcer that further discussion of the subject is unnecessary here.

Since we have had occasion to perform subtotal and total gastrectomies in a large series of cases, and since this experience has involved a variety of types of anesthesia and a variety of types of surgical procedure, it seems particularly worthwhile to present some of the deductions drawn from this experience and some of the modifications of the various anesthetic and surgical procedures, and to state the reason why the latter have been made. As I have repeatedly stated, there has been no operative procedure with which we have dealt which has been more difficult to standardize successfully, and in which it has been harder to eliminate complications and reduce the mortality, than that of total and subtotal gastrectomy.

The mortality in these radical operations for cancer of the stomach will always be high, owing to the fact that many patients are in advanced years with other associated serious lesions, that they often present themselves late in the disease, and particularly that since there is no other possible form of treatment the acceptance of desperate risks is entirely justifiable.

It is quite a different problem, however, when we consider the question of subtotal gastrectomy for gastric, duodenal or gastrojejunal ulcer. Here there does not exist the justification for unusual risks, and here one cannot justifiably continue to perform these operations if the mortality remains high. It is because we have successfully and progressively diminished the mortality of subtotal gastrectomy for ulcer that I am prompted to discuss some of our experiences. Our mortality with this operation three and a half years ago was 18 per cent. In the following year it was 11 per cent, and for the past year and a half it has been zero. We have now performed 47 consecutive subtotal gastrectomies for ulcer without a death. Included in this series are 9 cases of gastrojejunal ulcer, in

Presented at the annual meeting of the New England Surgical Society, Boston, October 1, 1938. From the Department of Surgery, Lahey Clinic, Boston.

\*Director, Lahey Clinic.

which the jejunum with its contained ulcer was resected together with the stomach, and 1 case of gastrojejunocolic fistula, in which the stomach, jejunum and the entire ascending and transverse colon were resected in one block.

One of the factors which has, I believe, played a most prominent part in the production of complications and mortality in these procedures has been the type of anesthesia. We began our total and subtotal gastrectomies using ether anesthesia, but its disadvantages soon became obvious. These gastrectomies involve so many technical steps in the upper part of the abdomen and in such deep cavities that a situation most undesirable for ether anesthesia arises. Patients who are poor risks, often in advanced years, must for adequate relaxation be kept under deep ether anesthesia too long, and it soon became evident that deep anesthesia over such periods was followed by profound shock. We therefore next undertook subtotal gastrectomy under ethylene anesthesia, given through an intratracheal catheter, plus regional infiltration with Metycain in the abdominal wall. Under this plan a considerable number of subtotal and a few total gastrectomies were accomplished with fairly satisfactory relaxation, but still with considerable degrees of shock. When splanchnic anesthesia was added to intratracheal ethylene and regional anesthesia, there was more adequate relaxation and less of a drop in blood pressure. Because inhalation anesthesia in general provides a degree of relaxation inadequate to facilitate high gastric resections, we turned to spinal anesthesia, employing novocain, Spinocain and Metycain. The disadvantage of this type of anesthesia was the limited length of time on which one could count for complete relaxation, it was often limited to an hour or an hour and a half, and rarely extended over an hour and three quarters. This kind of anesthesia was distinctly undesirable for patients undergoing total or subtotal gastrectomy. When patients who had been under spinal anesthesia for an hour or an hour and a half and who had already undergone a certain number of manipulative procedures in the upper part of the abdomen that are so well calculated to produce shock came out of their spinal anesthesia and required a deep general anesthesia to produce relaxation sufficient to complete the technical procedures deep in the upper abdomen, the result was often a severe degree of shock, which in many cases no doubt resulted ultimately in fatalities, or in pulmonary complications that ultimately brought them about.

Satisfactory anesthesia for patients submitted to subtotal and total gastrectomies was not obtained until dilute nupercain spinal anesthesia became

available. When we first began to employ nupercain spinal anesthesia, although it produced the desired length of anesthesia, it likewise caused unfavorable complications and even fatalities. It was not until W. Howard Jones,<sup>1</sup> of London, proposed the employment of a dilute solution, 1:1500, that these objectionable features were eliminated. By the employment of a 1:1500 solution, in doses up to 20 cc in proportion to the height of the individual, satisfactory high spinal anesthesia for total and subtotal gastrectomy is now secured. Complete motor relaxation is sustained for two and a half to three hours, with even less of a drop in blood pressure than occurs with the spinal anesthetics in which novocain is employed. There has not infrequently been an earlier loss of sensory anesthesia than of motor anesthesia, but this condition can be cared for by the light administration of a supplementary anesthetic. There has been nothing in our experience—which has so far embraced more than 300 cases—that has played a greater part in lowering the mortality and complications in subtotal and total gastrectomies than has this type of spinal anesthesia.

Since we have employed all the different types of operative procedures for partial gastrectomy, it will be of value to present the reasons why we have given up some of them, and to demonstrate the type of procedure which we have employed for several years. We do so not because we believe it to be the one which should be universally employed, but because it represents, at least in our hands, the ultimate procedure arrived at after a considerable experience with other methods and their gradual elimination.

As a result of our experience with the Billroth I operation we are convinced that it is the *safest* of all methods of performing subtotal gastrectomy. This is due to the fact that the operation is conducted above the transverse colon, with the omentum covering the small intestine, without any great disturbance of the abdominal contents, and thus with less danger of general peritoneal contamination. With the direct anastomosis between the open end of the duodenum and the cut end of the stomach, this type of subtotal gastrectomy results in prompt drainage and little gastric stasis. The operation is followed by less shock and less danger of peritonitis than is any other procedure by which subtotal gastrectomy is accomplished. Its disadvantage, particularly in relation to the surgical treatment of ulcer, is that, since one must approximate the cut end of the duodenum and the cut end of the stomach, there is a constant tendency to remove inadequate amounts of stomach wall in order to facilitate approximation of the two structures, and thus not to accomplish the low post-



operative values for gastric acidity which are associated with high gastric resections. Furthermore, there have been recurrent ulcers in the new suture line in the Billroth I type of resection requiring reoperation and higher resection, and there has likewise been contraction of the anastomoses between the duodenum and the stomach. Except in bad-risk patients with local prepyloric malignant lesions we have largely abandoned the Billroth I procedure.

We have entirely eliminated the Billroth II type of subtotal gastrectomy, since it is impossible to make a satisfactory gastroenterostomy of the type called for by this operation when a sufficiently high subtotal gastrectomy is done.

For a number of years we employed the Reichel-Polya type of subtotal gastrectomy, but gave it up several years ago in favor of the Hofmeister antecolic type. Our reason was that an anastomosis between the jejunum and the entire open end of the stomach offers a greater chance of leakage than does one between a third of the open end of the stomach and the jejunum. In addition, post-operative roentgenograms have satisfied us that when two thirds of the cut end of the stomach is closed and the remaining third is anastomosed end-to-side to the jejunum, a better functioning stoma results, with a proper retention of food in the stomach over a longer period.

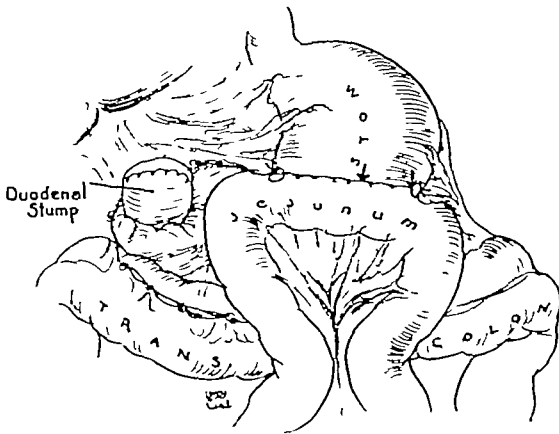


Figure 1

*This line drawing shows the antecolic Hofmeister type of anastomosis which we have now employed for several years. In this illustration the anastomotic opening into the stomach is between the arrows, the remaining cut end of the stomach being closed and the jejunum buttressed over it.*

The plan of operative procedure which we at present employ consists of the removal without stomach clamps of from three fourths to four fifths of the stomach, its transection by cautery between clips inserted by the von Petz sewing ma-

chine, the closure of the upper two thirds of the cut end of the stomach, and the anastomosis of a long loop of jejunum brought up over the transverse colon to the lower third of the cut end, the upper end of the jejunum being buttressed over the closed upper two thirds to reinforce it (Figs 1 and 2).

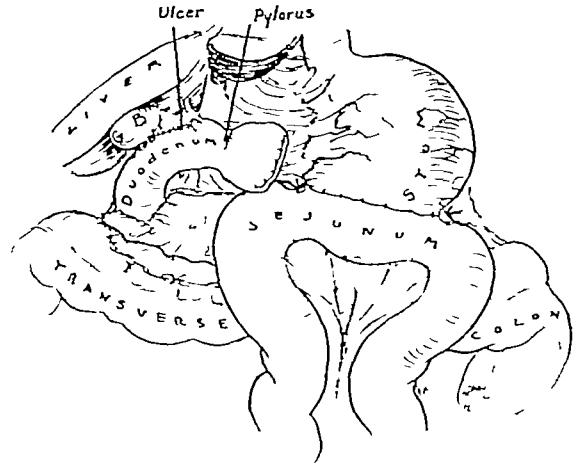


Figure 2.

*This illustrates the operation of resection and exclusion, as proposed by Finsterer. It is the same type of gastric resection (Hofmeister) as shown in Figure 1 but the duodenum with its contained low and adherent ulcer is left in place together with a small section of the prepyloric region of the stomach. In patients with badly adherent ulcers situated low on the duodenum and close to the entrance of the common duct into the duodenum this has been a valuable and mortality-diminishing type of operation.*

In the beginning, many of our anastomoses were made retrocolic in position. This procedure was given up because of the number of obstructions which occurred when the jejunum was brought through a rent in the mesentery of the transverse colon.

When we first employed antecolic Hofmeister anastomosis, enteroenterostomy was always done. This has been eliminated, for two reasons: because satisfactory function is obtained without it and an additional technical step, time-consuming in character and with the added risk of leakage, is avoided, and because in subtotal gastrectomy for ulcer it is physiologically undesirable. Subtotal gastrectomy for peptic ulcer is successful in proportion to its ability permanently to lower gastric acidity. It accomplishes this by the amount of stomach removed, thus eliminating a high fraction of the acid-bearing glands in the stomach wall, and by the return to the stomach from the jejunum of alkaline jejunal contents, which in turn lower gastric acidity by neutralizing the acids in the remaining gastric stump. When,

therefore, jejunojejunostomy is done between the proximal and distal loops of the jejunum anastomosed to the stomach, a large portion of the alkaline jejunal contents is thus sidetracked into the jejunum below the stomach, and does not return to the stomach to accomplish acid neutralization. For the last six years no enteroenterostomies have been performed in subtotal gastrectomies, and in but 1 case has there been an obstruction in the antecolic loop which required secondary operation and enteroenterostomy. In this case, I am convinced as a result of further experience that had I

nourishment required for normal activity. Technically, total gastrectomy has been made very much easier by gently wiping out that portion of the esophagus which runs through the diaphragm, thus obtaining 10 or 12 extra centimeters of esophagus, this permits anastomosis between the jejunum and the cut end of the esophagus to be made much nearer the abdominal wall and with much more adequate exposure than when it is made directly at the level of the diaphragm. We<sup>2</sup> have recently published our technical experiences with this operation, so that it is unnecessary to describe these

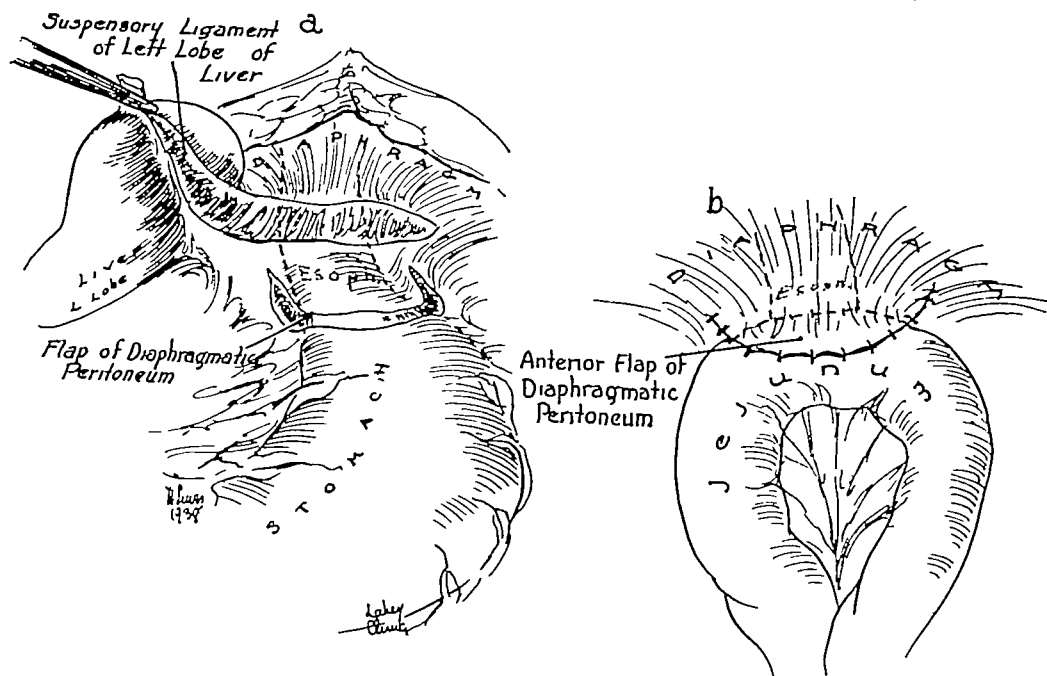


Figure 3 Total Gastrectomy

- a. This shows the anterior peritoneal apron cut from the peritoneal covering of the diaphragm and cardia, which is sutured to the jejunum below the line of anastomosis, thus removing traction on the line of suture between the jejunum and the esophagus. A similar flap is cut from the back.
- b. In this drawing the anterior peritoneal flap has been sutured to the jejunum. The posterior flap is similarly sutured.

been patient for a few days longer enteroenterostomy might also have proved unnecessary. Even in the last 4 total gastrectomies in which the end of the esophagus was sutured to the side of the jejunum, no enteroenterostomies have been done with the purpose of converting the proximal loop of jejunum into a semblance of a stomach in which food is retained over a considerable period of time.

Total gastrectomy has been performed in our clinic in 9 cases, in 5 of these it has been surgically successful, and the procedure has been demonstrated by a number of surgeons as technically feasible, leaving the patients in such a condition that they are able to eat enough food to gain the

steps in detail. One step, however, which is probably obvious to everyone experienced with total gastrectomy, is the fashioning of flaps of peritoneum from the diaphragm, to be attached to the jejunum below its anastomosis to the esophagus, so that its weight at that point will be removed from the suture line and be taken up by the flaps (Fig 3).

One of the postoperative complications which is most disturbing, particularly with subtotal gastrectomy, is that of failure of the anastomosed jejunum to drain the stomach. With increasing experience with this operation we have become more and more patient in waiting for these anastomoses to open. Recently a patient with high subtotal gastrectomy went for fifteen days without an

emptying of the stomach, only to have the anastomosis open completely on the sixteenth day and drain most satisfactorily from then on. It is by no means easy not to reoperate on patients in whom gastric emptying is delayed, but we are convinced from our and others' experiences that secondary operation may often be avoided if one will be patient for the anastomotic opening to establish itself.

In our earlier cases one of the most disturbing features of subtotal gastrectomy was the wound complications. Three factors, I feel sure, have played an important part in diminishing them. The first is the employment of a cellophane pad to protect wound edges, in which a strip of cellophane is sewed between two layers of gauze.<sup>3</sup> The second is the carrying out of a suggestion which I<sup>4</sup> made some years ago, to the effect that all patients with carcinoma of the stomach should be prepared for operation by repeated lavages with hydrochloric acid. An investigation in the clinic, soon to be published, demonstrates that by this means, even in cases of carcinoma of the stomach where there is no gastric acidity and a high bacterial count, the gastric contents may be made practically free of organisms. Finally, one of the most important factors having to do with the diminution of wound infection is the elimination of layer catgut sutures. Three or four years ago I began closing all abdominal wounds of patients submitted to subtotal gastrectomy with through-and-through mass silk sutures. This was soon modified so that the peritoneum was closed with a continuous locked chromic catgut suture and the remainder of the abdominal wall closed solely with through-and-through mass silk sutures, passing through skin, subcutaneous fat, fascia and muscle, but not through the peritoneum. This has been a very satisfactory method. There have been fewer eventrations, and there has been a marked saving of time, particularly desirable at the end of the operation when patient and surgeon have frequently already been subjected to a severe ordeal.

#### CONCLUSIONS

Subtotal and total gastrectomies for ulcer and cancer are being and will be, we believe, more frequently done than they have been in the past.

A considerable experience with all types of anesthesia in gastrectomy leads us to believe that dilute nupercain spinal anesthesia, 1:1500 dilution, using not more than 20 cc., provides as desirable a length of anesthesia, with as little shock, as can be obtained by any other type of anesthesia.

After varied experience with all the types of gastric resection, we are convinced that the Hofmeister type of subtotal gastrectomy, with antecolic anastomosis, is the most satisfactory.

Enteroenterostomy is not only unnecessary but undesirable.

Wound complications play a considerable part in the mortality of subtotal gastrectomy. They are materially lessened, we believe, by protecting all the wound edges with cellophane pads, by sterilizing the gastric contents—when the acidity is low or absent—by lavage with hydrochloric acid, and by the employment of a single layer of chromic catgut in suturing the peritoneum, with mass silk sutures for the remainder of the abdominal wall.

#### REFERENCES

- 1 Jones W H Spinal analgesia—new method and new drug—percaïne. *Brit. J. Anaesth.* 7:99 113 146-156 1930
- 2 Lahey F H and Marshall S F Technique of subtotal gastrectomy for ulcer. *Surg. Gynec. & Obst.* (in press)
- 3 Lahey F H A water proof laparotomy pad of gauze and cellophane. *J. A. M. A.* 104 1990 1935
- 4 *Idem* unpublished data

#### DISCUSSION

DR. CHARLES P CHANDLER, Montpelier, Vermont. As I have had no personal experience with either subtotal or total gastrectomy, my discussion must consist of a review of the available literature in relation to this subject. As the choice of the operation in each individual case apparently depends on the inclination of the surgeon, I shall confine myself to the reports from these operations as regards the operative mortality and postoperative morbidity.

The most pessimistic report appears in Babcock's textbook, where it is stated that when total gastrectomy is done for carcinoma of the stomach recurrence is inevitable and the patient has but one or two years of postoperative life, and that no permanent recovery has been recorded. This is evidently a misstatement, for I found that a large number of cases had been reported, some long before 1928, in which the postoperative life was five years or longer, furthermore, many of the patients died of causes other than recurrence. The most optimistic statement I found was in the closing paragraph of a paper written by Clute and Albright. This states: "From the standpoint of restoring health to the patient for a period of several months or years, the results of this operation are decidedly favorable. The patients have good appetite, they enjoy eating, and the disturbances subsequent to the operation may be controlled sufficiently to avoid discomfort. Some patients are able to resume their occupations and lead active lives. Between these extremes, a variety of results are reported."

The operation has apparently been done with much greater frequency in Europe than in the United States. Finsterer is reported to have performed it more than 2000 times with a mortality of 3 or 4 per cent in ulcer cases and 24 or 30 per cent in cancer cases. Veribily, in Budapest, has done 2400 resections, with a combined mortality in benign and malignant lesions of 7.8 per cent. No such series has been reported by an American surgeon.

The operative mortality in the cancer cases throughout America varies between 14 and 50 per cent, where the immediate cause of death was given it was attributed in the majority of cases to peritonitis resulting from leakage at the esophageal anastomosis. In the case reports there is a marked similarity in results. For example, Finney mentions 110 cases, all but 4 of which were shown to be carcinoma by pathological examination. Sixty-six patients recovered from the operation, but most of them survived for comparatively short periods, the longest being six years. Allen reported 16 cases, in 8 of which the patient

survived the operation. Five are still living, 2 had recurrences, 1, an ulcer case, was not traced, 2 are living and well, at fourteen months and four and a half years respectively. Of the many cases reviewed where long survival is mentioned—that is, a period of four years or more—there seemed to be a certain reticence as to the exact condition of the patient. I found, however, that in a number of these cases there developed a condition similar to pernicious anemia, and in some a true pernicious anemia, 1 such case being recorded at the Mayo Clinic in which the patient survived for three years. Allen attributes this condition to the fact that these patients do not eat meat. Merklen and Froehlich made a study of the blood of 28 gastrectomized patients, and concluded that gastrectomy does not cause pernicious or any other kind of anemia. They cited several reported cases of pernicious and other anemias which occurred in gastrectomized patients, but they considered these incidental and not due to the gastrectomy.

As a basis for a satisfactory result, I suggest the following: that the patient be able to regain, at least partially, the position he previously occupied in his community, that he give pleasure to his relatives and friends rather than be a care and that he derive enough enjoyment from life to make existence bearable. Practically none of the many case reports included any such information. In fact, a few left one with the impression that the lives of the patients had been prolonged not so much for their benefit as to demonstrate a feat of surgery.

Warwick reported autopsies on 176 patients who died of carcinoma of the stomach. Of these cases no metastasis was demonstrable in 23 per cent. This clearly indicates that many cases with a possibility of cure are overlooked. At present, with our improved methods of examination and diagnosis, such cases will be given the benefit of operation, with continued improvement along these lines we may hope for much earlier diagnoses, and the associated advance in technic will bring more favorable results. Thus far, at least, radical surgery offers the only known hope for the successful treatment of carcinoma of the stomach.

DR PEIRCE H. LEAVITT, Brockton, Massachusetts. I was very much impressed by the large number of patients with ulcer who have appeared at Dr. Lahey's clinic. There were so many that I suspect that surgeons like myself, practicing in much smaller cities than Boston, see very few cases in comparison, in fact not enough to warrant our doing gastrectomies. I believe that such cases should be left to specialists in this brand of surgery. The man who sees them only occasionally should not attempt to treat them, and if I myself had an ulcer of the stomach I should want it treated by someone who had cared for a great number of cases of this type.

I compliment Dr. Lahey on his excellent development of the operation, and the marked decrease in mortality he has been able to show.

DR EDWARD R. LAMPSON, Hartford, Connecticut. When Dr. Lahey published several years ago an article on subtotal gastrectomy for duodenal ulcer he reported a mortality of 18.5 per cent, as I remember it. He showed a great deal of courage in presenting a mortality of that degree. He then reported 47 cases with a 10 per cent mortality, he has now done nearly 50 consecutive cases with no deaths. This shows that he was absolutely justified in continuing the method that he finally adopted.

While in England a year ago I spent my afternoons visiting the London hospitals, where I found that they were largely employing the method of subtotal gastrectomy in their cases of gastric and duodenal ulcer. At the Mid-

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DR LAHEY. I realize that the subject of ulcer invites endless discussion. I meant particularly to present here our actual experiences with the technical side of this problem, because we have had such a bad time with it. Perhaps we have not been so apt as we should have been in reducing the mortality, but at any rate it was most distressing before the last year and a half to hear other surgeons speak of a mortality rate in subtotal gastrectomy of 2 per cent when we were unable to achieve it. We had been able to standardize nearly all the other major surgical procedures which we had undertaken on colons, rectums, diverticula and thyroids, and various other operations, but it seemed almost hopeless to reduce the mortality in subtotal gastrectomy. When I recall what made these operations difficult, I am convinced that there are definite factors which have brought the high mortality rate down to zero. I present these deductions not in a boastful spirit, but because they may be helpful. Nor do I mean to imply that my suggestions represent anything more than our own deductions. It is quite probable that other surgeons would have or have accomplished as great improvements in their mortality rates by methods different from ours.

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Another important point which I stressed yesterday morning was that, when the jejunum is anastomosed to the end of the stomach, the suture should be started near one mesenteric border. If done in this way, one finds, when the anastomosis is complete, that a sufficient portion of the lumen remains free. Another mistake which has undoubtedly been frequently made is to run the anastomosis of the jejunum to the stomach obliquely across the jejunum instead of exactly parallel with the mesentery, thus causing twists in the jejunum which do not drain well. These are technical mistakes, but they represent features which tend to create postoperative difficulties in this operation.

As regards hemorrhage, this is an extremely difficult subject to discuss because it opens up such a large field of possibilities. One should, however, recall our experience with hemorrhage, that is, that of all our patients having one hemorrhage, 40 per cent failed under medical treatment, and of all those having two or more hemorrhages, 80 per cent failed. It should be realized that there are two types of bleeding, the mild chronic and the serious progressive, in the latter of which everyone today admits that something radical must be done. This is a state which requires the keenest clinical judgment, since the decision to operate must be deferred until it is certain that the hemorrhage will be serious. Of course under these conditions it is possible either to wait too long or to operate too early and needlessly.

DR JOHN HOMANS, Boston Dr Maurice Richardson and those of his school, in my day, closed all their wounds with through-and-through sutures through all the layers, and even then that was a very old procedure. It was one that my father had used in his early oophorotomies. I dare say it came from England. In any case, I have never heard of any infection of the peritoneal cavity, I think that the sutures cut through the peritoneum very soon and that the latter must heal behind them within three or four days.

I question the statement that through and through sutures through all the coats of the abdominal wall cannot

be used, because apparently such sutures are much more effective if they include the peritoneum. Otherwise, the peritoneum very often opens up from behind because of pressure within or some other reason, and the whole incision opens just as though the through-and-through sutures were not there. I believe that if one is going to use such sutures to hold the abdominal wall, one should include in them the peritoneum.

DR. LAHEY We have closed about 100 patients without putting the stay sutures through the peritoneum, and I do not believe there has been a single eventration in the entire series. It occurred quite frequently when we employed layer catgut.

A MEMBER Do you mean that you put nothing in the fascia?

DR. LAHEY No I do not want anyone to infer that this method has the slightest originality. Kennedy and many others have used it. One of the reasons why I prefer to close the peritoneal cavity with a layer of catgut, instead of putting the through and through sutures into the peritoneal cavity through the parietal peritoneum, is that with an antecolic anastomosis of the Hofmeister type the two loops of jejunum are directly beneath the abdominal wall, and adhesions must not be allowed to form between the loops and the areas of possible reaction about through-and-through sutures that pass through all the layers.

## DAVID WILLIAMS CHEEVER\*

FRED B LUND, M.D.

BOSTON

THERE is one advantage which we older men have over you of the younger generation which nothing, not even time, can take from us. I mean the intimate knowledge and friendship of those heroes who were our teachers and seniors when we were beginners in the profession. We knew them because we lived with them, and learned to know their skill, kindness, courage, ability and generosity. You can never know and appreciate them in the same way, for the "oblivion of time" has come between. Such men were John Homans, Maurice Howe Richardson and, in the highest degree, David Williams Cheever, the subject of this sketch which will attempt, however inadequately, to describe the impression he made on us who were among his students and pupils toward the end of his career as a teacher. I often wonder whether it is possible for you to feel the same reverence for your seniors that we felt for ours. It hardly seems so.

The faculty of the Harvard Medical School, when our class entered it fifty years ago, was a most distinguished set of men. Thomas Dwight, professor of anatomy, Henry Pickering Bowditch

in physiology, Reginald Heber Fitz in pathology, occupied us for the first two years, and we then came by the route of bedside clinics at this hospital under the influence of the remarkable man to whom this amphitheater is being dedicated. Tall, erect, thin, rather delicate-looking, austere, yet with a sense of humor and a most engaging smile, we noticed that he wasted no words in his description and demonstration of the cases in the wards. Deliberate in motion and speech, his wonderful use of English, his choice of the *mot juste* and absence of rhetorical flourish, served to impress his statements on the minds of his students. His lectures, which covered the whole subject of surgery, were delivered in a manner so clear and concise that they could hardly fail to be retained in the memory. Naturally he was a most popular teacher, and great was the dismay of the students when, only two years after we had listened to these lectures, they were discontinued by his resignation at the age of sixty-two. His lectures were delivered without notes, yet when taken down by a stenographer and published almost without revision they formed a marvelously clear epitome of the surgery of the time. Didactic

\*Read at the dedication of the David W. Cheever Amphitheater, Dowling Building, Boston City Hospital, November 7, 1933.

survived the operation. Five are still living, 2 had recurrences, 1, an ulcer case, was not traced, 2 are living and well, at fourteen months and four and a half years respectively. Of the many cases reviewed where long survival is mentioned—that is, a period of four years or more—there seemed to be a certain reticence as to the exact condition of the patient. I found, however, that in a number of these cases there developed a condition similar to pernicious anemia, and in some a true pernicious anemia, 1 such case being recorded at the Mayo Clinic in which the patient survived for three years. Allen attributes this condition to the fact that these patients do not eat meat. Merklen and Froehlich made a study of the blood of 28 gastrectomized patients, and concluded that gastrectomy does not cause pernicious or any other kind of anemia. They cited several reported cases of pernicious and other anemias which occurred in gastrectomized patients, but they considered these incidental and not due to the gastrectomy.

As a basis for a satisfactory result, I suggest the following: that the patient be able to regain, at least partially, the position he previously occupied in his community, that he give pleasure to his relatives and friends rather than be a cure, and that he derive enough enjoyment from life to make existence bearable. Practically none of the many case reports included any such information. In fact, a few left one with the impression that the lives of the patients had been prolonged not so much for their benefit as to demonstrate a feat of surgery.

Warrick reported autopsies on 176 patients who died of carcinoma of the stomach. Of these cases no metastasis was demonstrable in 23 per cent. This clearly indicates that many cases with a possibility of cure are overlooked. At present, with our improved methods of examination and diagnosis, such cases will be given the benefit of operation, with continued improvement along these lines we may hope for much earlier diagnoses, and the associated advance in technic will bring more favorable results. Thus far, at least, radical surgery offers the only known hope for the successful treatment of carcinoma of the stomach.

DR PEIRCE H. LEAVITT, Brockton, Massachusetts: I was very much impressed by the large number of patients with ulcer who have appeared at Dr. Lahey's clinic. There were so many that I suspect that surgeons like myself practicing in much smaller cities than Boston, see very few cases in comparison, in fact not enough to warrant our doing gastrectomies. I believe that such cases should be left to specialists in this brand of surgery. The man who sees them only occasionally should not attempt to treat them, and if I myself had an ulcer of the stomach I should want it treated by someone who had cared for a great number of cases of this type.

I compliment Dr. Lahey on his excellent development of the operation, and the marked decrease in mortality he has been able to show.

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Our relations on the teaching staff were always regarded by me as leaving nothing to be desired. The elder man always took a sympathetic interest in his juniors' welfare. No occasion calling for a word of encouragement or congratulation was passed unnoticed, and if criticism was necessary, it was always skillfully concealed under the guise of fatherly suggestions. I have often wondered whether the currents of academic life flowed as smoothly in other departments of the University as they did in ours when he was chief. Perhaps it was because his depth of character brought a serenity with it which permeated the whole staff, one and all of whom were glad to acknowledge him as leader.

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which attracted attention he resisted the attempts of lawyers to extract from him confidential evidence revealed in the course of his practice

He was for many years president of the Medical Benevolent Society, and aided in every way those whose old age had come and brought with it indigence.

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At the meeting of the Boston Society for Medical Improvement on April 16, 1916, George Washington Gay,<sup>6</sup> Dr Cheever's lifelong associate and intimate friend, delivered a memorial address which is a model of its kind, it begins as follows:

Any eulogy of Dr Cheever is to be limited only by good taste and discretion. It would be difficult to overestimate his sterling character, his high ideals, his fine motives, his strict integrity and his exceptional service to the profession. His life was replete with wise and efficient activities. For more than half a century he was held in the highest esteem by the members of the medical profession, the court of last resort in determining the character and ability of any physician.

The esteem and appreciation shown in this memorial demonstrate that the longer and closer were

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hurry of the outpatient department. Certainly in Dr Cheever's case responsibility could not have fallen into more competent hands.

He was interested in the careers of his former students, and followed them up so far as he could. He established a scholarship for deserving first-year students. He published many monographs on surgical subjects, edited the five volumes of the Boston City Hospital reports from 1869 to 1894 and wrote much of the portion of the reports concerned with surgery, notably two important essays, "Medicine as a Trade" and "Medicine as a Profession." The former presented all the difficulties, the long and expensive study, the abuse of medical charity, and so forth, while the other emphasized the solid satisfactions to be gained from the profession. I quote the last sentence of the second essay: "The resources of our profession are endless in delight, and if you find in the beginning that you love it you will never cease to be happy in its pursuit." Other characteristic titles are "Is the Study of Medicine a Liberal Education?" "Does Surgery Advance?" His answers were that it is, and does.

A paper<sup>5</sup> describing Dr Cheever's three early ovariectomies, with two recoveries, was published in 1873, and it is noteworthy that in 1 case in which the patient recovered the vessels of the pedicle were tied separately and the pedicle was dropped into the abdomen, instead of being brought outside with the clamp left on, as was the custom of that time.

To speak generally, Dr Cheever's papers on professional relations and other general subjects were admirable in their conciseness and philosophical grasp, and as has been mentioned above, his feat of delivering a course of lectures on surgery without written notes, so clear and lucid that a stenographic report of it could be published almost without revision, is an instance of an intellectual *tour de force* unexampled so far as I know.

Many were the pithy sayings credited to him. To medical students entering practice he said "Choose your place and stick. Work all the time, always work—anything connected with the profession." Placing his own steady hand beside the trembling hand of a young patient with delirium tremens, he said, "An old man temperate, a young man intemperate." He told his pupils "The future is full of hope, and let's advance with a confident heart, still holding fast to that which is good. The magnet does not vibrate. The sun and stars are eternal in their courses. Nothing can deflect from his course him who studies, hopes, believes, works." One other true saying of his must be quoted here. "Whatever success I have

won has been due to a peculiar quality of my mind, concentration, one thing, only one thing, always one thing. A doctor, only a doctor, always a doctor. One school, one hospital, one pursuit, one profession. That has been my rule and my course." So he summed up his life's work.

Dr Cheever's long career as a surgeon and teacher embraced the pre-antiseptic period (he assisted his father at certain operations in Portsmouth even before anesthesia was discovered), the slow and hesitating adoption of antiseptic methods and the final achievement of the aseptic methods which we employ today. Great and indomitable must have been the heart of the surgeon before antiseptics, when the slightest operation might be followed by septicemia and death, and when, as Dr Cheever told us, amputation was the rule for nearly all cases of compound fracture, so great was the danger and difficulty of sepsis involving the bone.

Then came the slow and hesitating adoption of antiseptics, the carbolic solution and spray, the inevitable slips made by surgeons who had no training in bacteriology, and who could not recognize the breaks they inadvertently made, and finally the adoption of the aseptic technic, with the only use of antiseptics reserved for the skin, which cannot endure boiling temperatures, and the innumerable refinements connected with draping and technic in general. Hand in hand with this have gone the enormous improvements in anesthesia—local, spinal, intravenous, intratracheal—which allow us to fit the anesthetic to the individual case. Most of this fell within the active life of Dr Cheever, and so great were his enjoyment and appreciation of surgical advances that, as we have seen, he believed that no limit should be set to future surgical progress.

One of my pleasantest memories of Dr Cheever is the serene and placid way in which he presided at the evening clinical meetings of the staff of the Boston City Hospital, which were held in the library. He was most calm and judicious, and seemed to be saying, "Why so hot, little man?" when some of us waxed enthusiastic over our favorite incision for fracture of the patella, or method for radical cure of hernia, he frequently impressed upon us the fact that there is more than one road to Rome, and that one method may be well adapted to one case, another to another.

Something must be said about his interest in the welfare of his professional brethren and in medical legislation. Serene and self-controlled, he made an excellent appearance before legislative committees, and always made his point clear. He was a thorough believer in the confidential relations between doctor and patient, and in certain cases

which attracted attention he resisted the attempts of lawyers to extract from him confidential evidence revealed in the course of his practice.

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the heat and burden of the day keep fresh the memory of this great and good man, and gain from it an inspiration to higher ideals, harder work and more faithful service

319 Longwood Avenue.

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## SURGICAL DISEASES OF THE EXTRAHEPATIC BILE DUCTS\*

I S RAVDIN, MD†

PHILADELPHIA

**L**ESIONS of the extrahepatic bile passages are the second most frequent cause for abdominal operations by the general surgeon, yet our knowledge of the physiology and pathologic physiology of this system is still far from complete. Much remains to be done, but the information already available has added greatly to our knowledge of biliary function in health and disease.

When the liver bile is carried to the normal gall bladder certain changes in composition occur. The chloride and bicarbonate are removed. The base, bile salt, cholesterol and pigment are greatly concentrated. On the other hand, when the gall bladder becomes damaged the chloride and bicarbonate concentrations of the gall-bladder bile increase and the bile salt and calcium concentrations decrease. Thus, while the normal gall-bladder bile is acid, the bile from the damaged gall bladder tends to become alkaline.

Observations which we have made demonstrate that in extensive damage of the wall of the gall-bladder, fluid pours into its lumen instead of being absorbed from the bile. This phenomenon partly explains the failure of the diseased gall bladder to be visualized after the administration of sodium tetraiodophenolphthalein, since the dye coming from the liver is still further diluted and visualization of the gall bladder depends on concentration of the dye. Moreover, while in the wall of the normal gall bladder little or none of the dye is absorbed, a considerable amount is absorbed from the bile in a damaged gall bladder.

The degree of damage to the wall of the gall bladder is not stationary. During acute inflammation, and even at times during pregnancy, the gall bladder may not be visualized after dye administration, but at a subsequent period some recovery of the function may take place and the gall bladder may then be visualized. It is thus possible to find gallstones in a gall bladder which was

well visualized after the administration of sodium tetraiodophenolphthalein, and whose walls are only slightly thickened at operation.

Through the kindness of Dr Irving W Potter, of Buffalo, we were able to secure specimens of gall-bladder bile from 65 patients who underwent cesarean operations. The high incidence of gall bladder disease in women who are pregnant or have borne children has naturally led to the belief that there occurs in pregnancy a disturbance in metabolism which predisposes to the formation of gallstones.

The almost invariable hypercholesterinemia in pregnancy, and the absence in normal pregnancy of marked disturbances of the other blood constituents, suggest that the metabolism of cholesterol, of which the majority of gallstones are formed, may be deranged as a result of the gravid state. This hypercholesterinemia nearly always disappears before or very soon after delivery, and as a rule, at the time that calculous cholecystitis is diagnosed the blood cholesterol is normal.

No information is available on the concentration of the bile or blood cholesterol while the stone is being formed. Our early studies<sup>1</sup> showed that both hepatic and gall-bladder bile from patients with gallstones have variations in their composition from that obtained from normal patients. It was of interest to know whether the bile specimens obtained from pregnant women were normal or whether they showed any of the characteristics of the bile from patients known to have gall-bladder disease.

The bile-salt concentrations were all below those found in bile removed from a normally functioning gall bladder. The figures for the gall bladder bile cholesterol in pregnant women were distinctly higher than normal, in fact they were at times as much as five times the normal value. Thus, pregnancy bile contains a decreased amount of bile salt which is so necessary to keep cholesterol from precipitating out in the bile, at the same time the bile cholesterol is increased.

Presented at the annual meeting of the New Hampshire Medical Society Manchester May 17 1938

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These changes represent the preliminary ones which may precede the formation of stones, and indicate that the frequent occurrence of gallstones in pregnant women is not a chance coincidence but is the result of some change from the normal, either in the bile put out by the liver or the bile after it has been acted upon by the gall bladder

From the viewpoint of the clinician, cases of gall-bladder disease, exclusive of cancer, can be divided into two groups—with stones and without stones. There is no certain method of determining in all cases before operation whether stones are present. For several years we have had our patients studied roentgenographically and have studied the material obtained by duodenal drainage. Each method is open to certain errors, but each, in the hands of properly trained technicians, is sufficiently accurate to permit a high percentage of dependable results.

We have found that in gall-bladder bile obtained by duodenal drainage we have a more accurate means of determining the presence of gallstones preoperatively. When a "B" fraction of bile can be obtained the method is 90 per cent accurate in the diagnosis of stones, if the procedure is carried out by a qualified technician, while by x-ray we have positively visualized but 58 per cent of stones.

If one is to rate the accuracy of x-ray diagnosis on the end results of operations in these cases, it must be admitted that we often go astray in the diagnosis of chronic cholecystitis in the absence of stones. For in the gall bladder containing no calculus the end results of cholecystectomy are not nearly so good as in the calculous group.

Each of these methods has its advantages and disadvantages. When the case is studied by x-ray one must be sure that the patient has not vomited or had a bowel movement for at least six hours after the administration of the dye. When the films are made the first should cover the entire abdomen so as to include a gall bladder which may be displaced. At that time the dye should be demonstrable in the colon as a flaky material. Failure to verify these points may lead to an error in diagnosis.

When the method of duodenal drainage is used a "B" fraction is essential. If this is not obtained a positive diagnosis is not possible. Failure to obtain such a fraction, however, does not indicate cystic duct obstruction in every case, as is commonly believed.

Furthermore, the value of an excellent clinical history should not be underestimated, for occasionally too great emphasis is placed on the laboratory findings. They are by no means infallible. It is important to establish as carefully as possible before operation whether gall bladder disease

exists, but it is of equal importance to determine the presence of existing collateral disease.

It is well known by surgeons that one of the major causes of death after operation on the biliary tract is myocardial failure. Riesman and Babcock independently suggested that the streptococcus, which is most frequently the infecting organism in biliary tract infection, also causes myocardial degeneration. More recently Schwartz and Herman<sup>2</sup> have suggested that the myocardial change is the result of a fatty infiltration of the myocardium and that this is merely a part of the general increase in the adiposity of many of the patients who have gall-bladder disease.

For some time I have had the opinion that many of the patients who present evidences of serious cardiac disease at the time of operation had some initial cardiac lesion prior to the biliary tract disease. Though the gall-bladder lesion accentuated and aggravated the existing disease, in many cases it may not have been the sole etiologic factor.

In the last 536 biliary tract cases we have operated on there were 56 patients with evident cardiac disease, 18 of whom had evidence of severe myocardial disease by electrocardiographic findings, with signs of decompensation.

All patients suspected of having coincidental cardiovascular disease are studied jointly by the surgeon and the internist. Electrocardiographic and orthodiagraphic studies are made, as well as a careful physical examination of the heart. The operation is done when the surgeon and internist agree that the preparation has been adequate.

These patients do not, if properly protected before, during and after operation, present the serious risk which we are wont to expect, only 2 of the 56 patients with evident cardiac disease succumbed following operation and 1 of these had common duct obstruction. The observations of Fitz-Hugh and Wolferth<sup>3</sup> in this connection are indeed interesting in that following operation there is very often a rapid and marked improvement in the clinical as well as the electrocardiographic picture.

I cannot pass the cardiac aspects of biliary tract disease without saying a word about the patients with myocarditis and angina pectoris whose biliary symptoms may be so slight as to be overlooked. Many of these patients are relieved of their most distressing symptoms by competent biliary tract surgery. Surely injections of and operations on the sympathetic nervous system should be delayed until after the necessary biliary tract surgery has been accomplished. The surprising thing is that at that time further surgery will often not be required.

In nearly every case in our series there has

been improvement in the patient's cardiac symptoms, and while the end results in this respect may not be so good as those obtained after thyroidectomy in the thyrocardiac patient, they are sufficiently good to warrant operation, the gravest myocardial damage need not be a contraindication. The operation has at times consisted only of a cholecystostomy under local anesthesia. In fact, the remarkable and early improvement which occurred in several of our patients whose gall bladders were merely drained leads us to question whether factors other than infection and mere obesity, such as a reflex phenomenon, may not play a part in accentuating an existing cardiac abnormality.

Diabetes mellitus was encountered in 29 of the last 536 patients in whom gallstone disease was present. This association is more than casual, and in certain cases we must agree that there is at least an etiologic relation between the two diseases.

Joslin has stressed the association of obesity and diabetes. Here again we find a close relation to cholecystic disease, for many of the patients with biliary tract disease are overweight. The combination of cholecystitis and hepatitis results in a liver whose ability to store glycogen is below normal.

The high glucose-tolerance curves seen in patients with severe hepatic disease are often not unlike those of diabetic patients. The association of hepatitis, cholecystitis and diabetes so disturbs the glucose metabolism that problems of the most perplexing character confront the clinician. We have repeatedly observed that the diabetic patient with severe hepatic disease is difficult to standardize. He is frequently thrown into hypoglycemic shock by doses of insulin which would have little effect in the presence of a more normally functioning liver.

The higher incidence of diabetes in our group of patients than is found in the normal population suggests that the patient with long-standing cholecystic disease is more prone to diabetes than is the normal individual. Certainly in those patients who only to a slight degree tend to become diabetic, that is the latent cases, the cholecystic disease may tend to accentuate the condition.

We have become accustomed to thinking in terms of liver damage in biliary tract disease when the patient is jaundiced. That the liver glycogen stores may be just as seriously reduced when there exists a widespread hepatitis is not so well understood, but is nevertheless true, for hepatic parenchyma damaged by infection, cirrhosis and fatty infiltration such as is frequently

observed in long-standing cholecystic disease is not conducive to normal storage of glycogen.

We have run the gamut of liver function tests, galactose and glucose tolerance tests, phosphatase determinations, bromsulphalein tests, hippuric acid tests and many others, and have come to the conclusion that hardly any of these are of constant and sufficient value to deserve much reliance. The latter two are of some value, but the compensatory activity of the liver is so great that extensive liver injury exists before even these tests demonstrate hepatic injury. At such a time the tests are too frequently unnecessary.

The van den Bergh determination is of real help in showing the degree of bile pigment retention in the blood stream. It is, however, not a test of liver function. The hippuric acid conjugation method of Quick<sup>4</sup> is at present the best method available for determining hepatic function, but it too frequently fails to indicate early or moderate liver injury. In an organ whose functions are so diversified it is hardly possible that any one test will ever give us an adequate conception of complete function.

It may be inferred from my remarks that I consider gall-bladder disease entirely a surgical problem. This is not true. To operate on every patient with cholecystitis is a mistake. From 10 to 12 per cent of our population past forty years of age have gallstones. Only those patients with symptoms of indigestion or colic or both, and those with cardiac disease or diabetes mellitus, need be considered for operation. Symptomless stones might well be retained and the patient not be exposed to the dangers, even though these be few, of surgical therapy.

While I speak with some positiveness in regard to the stone-containing gall bladder, it is not possible to do so in regard to the non-calculous gall bladder. Nothing has done more harm to the surgery of the biliary tract than the wholesale removal of the blue, thin-walled gall bladder which grossly and microscopically shows little evidence of disease. Even the gall bladder of cholesterosis is but one evidence of a profound disturbance in the lipid metabolism. It is not an inflammatory lesion, and its removal is too frequently followed by a poor end result and a dissatisfied patient.

Even though the symptoms point strongly to cholecystic disease, the gall bladder should not be removed if careful exploration fails to reveal good evidence of disease. The frequency with which colitis may simulate cholecystic disease is ample evidence that not all pain in the right upper quadrant is the result of biliary tract disease.

Nothing has retarded early operation in patients requiring biliary tract surgery so much as



the fact that from 40 to 60 per cent of the non-calculous cases subjected to cholecystectomy fail to obtain the relief which they expected. Surely if disease of the gall bladder were the cause of the symptoms, the end results in this group should be of the best, for the patients would be in an earlier stage of biliary tract disease.

Surgery of the gall bladder is not the cure for all types of the strawberry gall bladder, for colitis and for dyskinesia of the biliary passages, a lesion which is receiving too little attention in this country. The non-calculous gall bladder and the chronic appendix belong to much the same category, and the surgical treatment of either of these conditions has added to the reputation of the surgeon.

There is a large group of patients who have had one or two attacks of cholecystitis, and in whom the evidence is strongly against the presence of stones, who also should be treated by non-surgical methods to ascertain whether they can be kept comfortable. Should a medical regime fail to give relief from symptoms, surgery can then be done.

In acute gall-bladder inflammation, associated with cystic duct obstruction, early operation is, I believe, desirable, for it permits of cholecystectomy, while the edema, suppuration, gangrene and perforation which so frequently follow acute cystic duct obstruction increase the hazards of either cholecystectomy or cholecystotomy. I find myself in sympathy with those who believe that, in general, delay increases the risk. On the other hand, when the patient is seen three or four days following the onset of the attack, palliation is often desirable, if the evidence points to a subsidence of the acute process.

I do not believe, however, that cholecystectomy should be done in every case regardless of the stage of the disease, for it is often wiser to do a cholecystostomy and drain a localized subhepatic abscess than to open widely an area of limited peritoneal infection. It is rare for the gall bladder to perforate into the free peritoneal cavity, and from this point of view the acutely inflamed gall bladder need not be compared to the acutely inflamed appendix.

It is of the greatest importance that the anatomic relations at the junction of the cystic and common ducts be carefully visualized. The damage to an abnormally placed right hepatic duct may prove difficult to repair even though the injury is observed during the operation. Ligation of an anomalously located hepatic artery will result in death, and the catastrophe has infrequently been ascribed to cardiac failure.

There seems still to be a difference of opinion

as to whether the common duct should be opened in the absence of jaundice. We find that in the presence of common duct dilatation, even in the absence of a previous history of jaundice, this is often a wise procedure. Increasing experience with common duct exploration in non-jaundiced patients has convinced us that Lahey is correct. The dilated common duct, especially when there is an accompanying dilatation of the cystic duct, frequently contains stones. The time to remove these is at the original operation.

The question of whether to drain after cholecystectomy is still a moot point. It is our practice to drain with a small soft-rubber tube. One of the most distinguished advocates of non-drainage in this country has said that failure to drain will be regretted in not more than 2 patients in 100. If this be true the mortality of simple cholecystectomy for calculous or non-calculous disease is doubled by failure to introduce a safety valve in the event of bile leakage and threatened bile peritonitis.

While the problems associated with simple gallstone disease are numerous, they are now more clearly understood and there is a more or less generally uniform understanding concerning them. When, however, a stone passes into the common duct, and jaundice occurs, the problems confronting the patient and the clinician are greatly multiplied, their complexity is increased and our understanding of the pathologic physiology which follows biliary obstruction is not clear.

The problems involved in the successful treatment of patients with obstruction of the common bile duct are often so numerous and so difficult of solution that one is surprised that the mortality is not higher than it now is. Whether the obstruction is due to a stone, a tumor or cicatricial stenosis, there occurs with the advent of ductal occlusion an increase in the pressure in the intra-hepatic and extrahepatic bile ducts. As a result of this, the liver cells attempt to carry on their manifold functions against an increasing pressure obstacle. When, after complete ductal obstruction, the pressure in the hepatic ducts reaches 330 mm of the bile itself, hepatic secretory function ceases, so far as any normal function is concerned.

Even at this time many of the functions of the liver continue with little evidence of interference. Glycogenolysis and glycogen deposition are affected but not completely suppressed. Urea continues to be formed. Fibrinogen formation is not affected. Thus the tangible functions are continued in the face of complete secretory suppression.

There occurs at this time a failure of bile pigment to pass into the common duct and, as a

corollary, a retention of bile pigment in the blood with resultant evidences of jaundice. The degree of bile pigment retention depends on several factors. If the obstruction is associated with a normally functioning gall bladder, as occurs in carcinoma of the head of the pancreas or of the papilla of Vater, deep icterus may be delayed for a time.

When the hepatic secretory suppression occurs, the mucous secretion of the bile ducts dilutes the trapped bile, and as the pigment is absorbed by these cells, hydrohepatosis results, at which time so-called "white bile" fills the hepatic ductal system. It is during the state of partial liver insufficiency that so many of these patients seek surgical aid.

In 1929 I<sup>5</sup> reported evidence showing that the glycogen stores of the liver may be severely affected in complete common duct obstruction. Since the function the liver plays in carbohydrate metabolism is among its most important ones, any interference with this metabolism is of considerable significance. We have, however, concluded that too much emphasis has been placed on the carbohydrate aspects of liver function in biliary tract disease, and too little on the metabolism of fat in the liver.

It is true that normally a high liver glycogen is associated with a low liver fat, but it is possible to have a high glycogen content of the liver and simultaneous high liver fat. Moreover, it has not been demonstrated that with the methods now used during the period of preoperative treatment the liver fat can be considerably affected.

Of the greatest importance is the fact that in the presence of liver damage in association with hepatitis and common duct obstruction, large amounts of fat may remain in the liver after what we have believed to be a vigorous type of glucose therapy. This we have demonstrated in patients we have prepared for operation.

It is, we believe, the amount of fat in the liver, regardless of the glycogen level, that conditions the precipitation of liver injury after the use of volatile anesthetics. Thus, a high liver glycogen will not protect against liver injury following the use of chloroform ether or Vinethene if the amount of fat in the liver exceeds 14 per cent, which is only one and five-tenths to two times the normal amount. Furthermore, such a liver is more easily damaged by the anoxemia associated with nitrous oxide and oxygen anesthesia or even spinal anesthesia when accompanied by marked hypotension.

We have repeatedly observed that the depletion of liver glycogen permits additional fat to come to the liver. If, as a result of cell injury,

either from obstruction, infection or any other factor causing a depletion of the glycogen reserve, the liver fat stores are increased, liver necrosis may occur during anesthesia. Liver anoxia is known to exist in common duct obstruction. Thus, a number of factors are associated to produce a vicious circle leading to further liver injury. And the additional injury precipitated by operation and anesthesia may be the important factor in the end result.

It is because of the manifold problems which confront us in these patients that I wish to discuss a rational therapy for preparing the bad risk biliary group with or without obstructive jaundice for operation, as well as certain factors in the operative and postoperative therapy.

Waltman Walters has called attention to the importance of operating on severely jaundiced patients at a time when the level of bile pigment retention in the blood is more or less stationary. The significance of this observation is only too frequently overlooked.

There is no doubt in my mind that the patient who is operated on when the van den Bergh shows a constant level of the serum bilirubin, whether this be high or low, is better able to withstand the additional trauma of operation than is the patient who is operated on in the face of a rapidly rising bile pigment concentration in the blood. This is one of the reasons why I do not believe it is necessary to rush the jaundiced patient to operation. A few days or even a few weeks of careful preparation in certain cases is of more importance than the fact that delay in operation prolongs the period of jaundice. If the serum bilirubin is rising we wait until it has reached a stationary level. If it is falling, we wait until the maximum improvement has taken place.

Since carbohydrates are the major source of liver glycogen, an attempt should be made to increase the carbohydrate intake prior to operation. This may be accomplished in part by frequent high carbohydrate feedings by mouth, reinforced by the intravenous administration of glucose. The anorexia from which so many of these patients suffer can be corrected by the use of large amounts (750 international units) of vitamin B<sub>1</sub> daily plus the use of lyophilized human or pig's bile. However, it must be remembered that even though the glycogen stores are temporarily replenished, they are again rapidly depleted by the very factors which initiated the process in the beginning—ductal obstruction. It is therefore incorrect to assume too much from the simple preoperative administration of glucose unless the therapy is pushed by every available means and over a sufficiently long period of time.

The glucose which is given preoperatively should be given very slowly, since the sugar tolerance is greatly reduced. As it is usually administered by an intern, from 50 to 100 gm may be introduced in ten or twenty minutes and fully a half or more of the glucose may merely flow out in the urine. It has been our experience that spilling over into the urine will not occur if not more than 20 gm per hour is injected intravenously into the average-sized adult.

Since our attention has been focused more directly on the fat content of the liver in the preoperative period, we have changed our preoperative therapy. Our investigations have shown us that it is only possible to increase the glycogen stores greatly during this period by the most intensive carbohydrate feeding. Nevertheless it is essential to rid the liver of the accumulated fat which may be present. The addition of protein to the high-carbohydrate diet in the amount of 14 per cent of the total calories is, we believe, useful in accomplishing this. The protein-carbohydrate diet is the best diet where a low-fat liver is desired.

One of the most distressing complications of operation on the jaundiced patient is hemorrhage. There has existed no satisfactory explanation why, given two patients with an equal degree of jaundice from common duct obstruction, one will bleed after operation while the other goes on to an uncomplicated recovery, until Quick<sup>8</sup> began his studies on the prothrombin time of these patients.

We have at our disposal at the present time, in the study of prothrombin time, a satisfactory method of prognosticating which patient will bleed and which will not. The venous pressure bleeding time, recently suggested by Ivy<sup>7</sup> for this purpose, and the sedimentation rate of Linton have not proved satisfactory in our hands.

The prothrombin time is studied by us in every jaundiced patient. Bile feedings are immediately begun, either in the form of lyophilized bile or by the administration of sodium deoxycholate. In addition we are using a potent source of vitamin K as suggested by Greaves and Schmidt.<sup>9</sup> Since this method of preparation was begun we have not had a single serious case of postoperative hemorrhage.

It is of course possible that the liver injury may be so severe that diet and bile and vitamin K may occasionally prove ineffectual, but the rapidity with which improvement of the liver may take place under suitable conditions leads me to believe that such cases will be rare.

Regardless of the method of preparation, up to the time we began the use of bile and vitamin K in the preoperative period, hemorrhage incidence

in our patients remained approximately the same. With this method of therapy, surgeons need no longer lull themselves into a sense of false security by pouring calcium into the veins of their patients. The occasional use of small transfusions in the preoperative period is undoubtedly of advantage, and in the period prior to the use of bile and vitamin K it did more than anything else to reduce the deaths from hemorrhage.

One can hardly discuss treatment without referring briefly to certain aspects of the operation, for while more adequate preoperative and postoperative care has contributed to a reduction in the morbidity of operations on the biliary tract, certain factors concerned with the operation itself have, in our hands at least, contributed in large measure to the safety of the bad-risk patient.

We believe that the most satisfactory anesthetic in the biliary tract cases is spinal anesthesia. If the patients are given ephedrine prior to the administration of the anesthetic, as suggested by Ferguson and North,<sup>9</sup> and if the anesthetic does not exceed 150 mg of novocain, the drop in the blood pressure is never alarming and the facility with which the operation can be done adds greatly to the safety of surgical intervention. So far as I know, spinal anesthesia alone, with the exception of local anesthesia, will permit of extensive operations on the biliary tract without in any way affecting the liver tissue.

Contrary to general opinion, nitrous oxide and oxygen anesthesia is not safe in the jaundiced patient. The increased anoxia which this anesthetic induces in the liver cells may prove of serious consequence in that further liver degeneration and necrosis may occur. Even Cyclopropane, which permits the use of a high concentration of oxygen, has not proved a very safe anesthetic in such cases.

There are a number of serious problems that may arise in postoperative periods which may be prevented by careful attention to the postoperative therapy. Patients with long-standing or complete obstruction of the common duct should have a slow decompression of the biliary passages after operation. This can be accomplished in a manner similar to decompression of the urinary bladder, except that the obstacle must be provided after operation, since the very nature of the operation tends to result in sudden biliary decompression. If the method of slow decompression is instituted, the sudden hepatic hyperemia which follows the restoration of a free, portal venous blood flow can be controlled.

The use of a slow, continuous intravenous drip of glucose and saline is of the greatest value in the postoperative period. It is after the release

of the obstruction that the liver cells can resume their normal function, and no single substance is so helpful in the postoperative period in aiding the hepatic cells to recover as is glucose

In the badly jaundiced patients, or in those whose jaundice has been of long standing, we believe that the judicious use of small transfusions—250 to 500 cc—in the postoperative period reduces the mortality and results in a smoother convalescence. The feeding of vitamin K is continued in the postoperative period. It will not be long before there is available a purer preparation which can be given parenterally to individuals with a non-retentive stomach.

In the postoperative care of the jaundiced patient we have found that the early restoration to the gastrointestinal tract of the bile obtained by external drainage is of the greatest value. With the use of our decompression method, bile feeding by a Jutte tube is not required, provided the obstruction has been removed.

The extrahepatic functions of the bile play a most important part in the body economy, and a normal intestinal function will follow the adoption of this method in patients whose total or major bile excretion is flowing to the exterior. Since we began this method we have not observed a single instance of pancreatic insufficiency.

I cannot leave certain of the postoperative problems of the biliary tract patient without saying a word about liver shock. Many theories have been elaborated to explain the condition of profound vasomotor depression which occurs in occasional cases after biliary tract surgery and which, in spite of treatment, frequently results in death. The major types of shock are due to ligation or thrombosis of the main hepatic artery. If this catastrophe occurs there take place hypoglycemia, a falling blood pressure, a rising pulse rate and hyperpyrexia. While glucose may give temporary relief, it cannot save the patient.

Although the character and thoroughness of the operation play an important part in the end result of any biliary tract operation, there remains the small group of patients in whom operation was rightly indicated, but who continue to complain of dyspeptic symptoms. If we exclude those patients in whom, as a result of some postoperative sequelae, certain symptoms continue, there still remains a group in which after a technically perfect operation, which was fully indicated, the expected relief failed to follow. Deaver and others have thought that in many of these patients a chronic pancreatitis accounted for many of the residual symptoms.

The failure to relieve fully certain of these patients can, however, be explained by the change

in function of the gall bladder and the liver in long-standing biliary tract disease. The bile salts, which play such an important role in the activation of the lipases, in the digestion and transport of fat, and, in the absorption of a variety of important vitamins, are reduced in concentration in hepatitis, so that the bile entering the intestine is inadequate to fulfill the role which it normally plays in the digestive and metabolic processes.

Any condition which interferes with the normal enterohepatic circulation of certain of the bile constituents or prevents their formation in normal amounts may result in an interference with the extrahepatic functions of the bile, and dyspeptic symptoms will then persist. Thus, if after long-standing cholecystic disease there results a permanently damaged liver, it is highly possible that even cholecystectomy and common duct operations will not bring the full measure of expected relief from symptoms.

These patients will, however, prove to be the exceptions, for with a clearer understanding of the responsibilities of internist and surgeon the patient will come to operation at a time when surgery can offer its best. With careful preparation for operation, after a critical survey of the patient's condition, with a well-planned operation, which is skillfully executed with attention to the minutiae of postoperative care, complicating cardiac disease, hepatitis, diabetes or even jaundice are no longer the bugbears which they once were, and the surgeon can approach these problems with confidence that the final outcome will be good in nearly every case.

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#### DISCUSSION

DR. WALTER H. LACEY, Keene, New Hampshire. Dr. Ravdin's paper is full of common sense and is very comprehensive.

I should like to ask about the type of incision. I have been distressed by the number of hernias that I have had

as a postoperative result, and lately I have broken away from using the mid rectus incision and have used a right-rectus, retracting incision, drawing back the rectus muscle from the midline over to the side. I have also used a stab drain for my drainage wick, outside the line of suture, hoping that I should get away, also, from some of the distressing postoperative symptoms that come from adhesions.

I was glad to hear Dr Ravdin speak about spinal anesthesia, it certainly gives the best relaxation. I have been using the type of spinal anesthesia they employ at the Faulkner Hospital in Boston,—a combination of novocain and pontocaine,—with very satisfactory results. One gets more relaxation and can therefore do a better piece of work.

DR. CHESTER L. SMART, Lacomia, New Hampshire. This is one of the finest papers on gall-bladder disease I have ever heard. It seems ridiculous for a man from up in the country to try to discuss such a comprehensive review. However, there are two or three things that I shall mention.

In 1919, Drs Charles and William Mayo wrote in *Keen's Surgery*. Operations for simple gallstones are exceedingly safe and the mortality does not exceed 0.3 per cent from all causes, and the percentage of cures is very high, at least 95. Mortality from cholecystectomy is 0.3 per cent higher. Since then, the pendulum has swung way over to the other side, and now if one does not remove a diseased gall bladder he is open to grave criticism, indeed, I have occasionally heard doctors who have for some good reason failed to remove a gall bladder accused of something like malpractice by their patients.

I believe that gall bladders are frequently found which are in too bad a condition to remove, and, in such cases, the risk of cholecystectomy is much greater than that of a cholecystostomy. I refer particularly to acute empyema of the gall bladder in elderly or debilitated patients. Frequently these patients are terribly sick. The gall bladder is wrapped about with omentum, occasionally the tip only is visible, and that distended and dark, the ducts are greatly congested and edematous. In these cases a cholecystostomy can be done, the obstructing stone removed, a tube inserted and the wound closed in a minimum of time and with little shock, and frequently under local anesthesia. I am sure that if one were to remove the gall bladder the mortality would be much higher.

I also believe that in cases of acute or chronic pancreatitis the treatment of choice is cholecystostomy with prolonged drainage, a procedure which gives the inflammation in the pancreas the best chance to subside, I mean by prolonged drainage a period of at least three months.

DR. DAVID W. PARKER, Manchester, New Hampshire. I repeat what Dr Smart just said about Dr Ravdin's paper: it is the most intensive, practical report that I have heard for years. I should like to have Dr Ravdin speak a little more fully on the acute gall bladder as we occa-

sionally see it. The pendulum is, perhaps, swinging more toward treating it like acute appendicitis. In 2 of my acute cases, I delayed the operation for several days until the symptoms quieted down, on operating I found a small abscess down around the cystic duct. Of course, if one operates early one has other things to contend with—one is between the devil and the deep sea.

DR. RAVDIN (closing). In the subcostal incision, which we have used for sixteen years, the drainage tube is brought out through the lateral edge of the incision. The incidence of hernia has been about 4 per cent. The late Dr Dan Jones of Boston used this type of incision for many years. I believe that the patient is more comfortable when it is used. Respiratory exercises can be more easily carried out, and the incidence of postoperative pulmonary complications is therefore lower. The exposure of the undersurfaces of the liver and the common duct is, I believe, better than that obtained with any other incision.

As to cholecystostomy, of course there is a place for it. The surgeon who says he never does a cholecystostomy is either losing patients whom he should not lose or is not doing much biliary tract surgery. At another state society meeting which I attended not very long ago, a surgeon reported the results of cholecystectomy for acute cholecystic disease. His mortality was 17.6 per cent. It is true that the mortality for cholecystectomy for acute cystic duct obstruction in the hands of certain surgeons is much lower than that, but one must not consider what it is in the hands of a few surgeons, one must consider what it is in the hands of the majority of surgeons.

On my own service, there has not been a death from cholecystectomy in eleven years. This of course excludes the common-duct cases. But I am sure that had we done cholecystectomy in every case with acute gall-bladder infection I could not make this statement. Furthermore, as I said in my paper, I believe that in certain patients with serious cardiac disease and decompensation, drainage of the gall bladder is sometimes the primary operation and frequently the only one to do. If patients are seen early, cholecystectomy is the operation of choice. But when the patient is seen three, four or five days after the onset of the attack, and as the result of obstruction in the neck of the gall bladder there have occurred gangrene, necrosis and perforation, with subhepatic abscess, which is always a localized abscess, that is a different story. I have seen but 1 case of generalized peritonitis from a perforated gall bladder. The very anatomic relations seem to localize it.

I believe that the wide exposure needed in these cases in order to visualize clearly the cystic and the common ducts increases the hazards of cholecystectomy. In most of such cases we have believed it wiser to do a simple cholecystostomy and drain the hepatic abscess, advising patients to come back in three months for cholecystectomy. If they return in the interim, when the infection has subsided, the separation of adhesions from the gall bladder is an easy process, and cholecystectomy can be done with a minimum of risk.

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# CHEMICAL AND PHYSICAL PROPERTIES OF VINYL ETHER

Vinyl ether is a clear, colorless fluid which possesses a characteristic odor. This odor is not unpleasant, and we have never had a patient complain about it, or object to the administration of vinyl ether when it was to be used a second time. Owing to its low boiling point ( $28-31^{\circ}\text{C}$ ), vinyl ether is very volatile and vaporizes with extreme rapidity. It decomposes somewhat on exposure to light and air, and hence should not be employed if the containing bottle has been open for more than twenty-four hours. However, when left unopened in the tightly capped, dark-colored bottle\* in which it is supplied, it may be safely stored for a year or more. Vinyl ether is inflammable, its explosive properties being about the same as those of ethyl ether.

## DESCRIPTION OF VINYL ETHER ANESTHESIA

Vinyl ether may be administered in a closed gas machine of suitable type or may be dropped on an open (Yankauer) mask. We have had no experience with the closed-machine method, because it is too expensive, it is also wasteful, since any unused portion of the drug must be discarded. However, in an accident ward where such a machine is being used frequently, this method of administration would probably be quite satisfactory.

In all cases of the present series the open-mask method was employed. Caution must be taken regarding the type of mask, for it is absolutely necessary that a large amount of air be available to the patient at all times. Because of this, a closed mask is unsatisfactory. Nor is it advisable to surround an open mask of the Yankauer type with a cuff or towel to prevent cross-drafts and loss of the highly volatile vinyl ether. This was attempted in 1 case, with resultant cyanosis, which was completely relieved as soon as the towel was removed and the patient was permitted to have more air.

The Yankauer mask, covered with six or eight layers of gauze, is placed over the mouth and nose, resting lightly on the skin of the face so that all inspired air is drawn through the mask and none around it. The anesthetic is then dropped at an even rate, beginning with one or two drops per second, different parts of the mask surface being moistened. At first one is likely to be a little timid in administering this potent drug, but experience with only a few cases gives convincing evidence of its safety and the ease of induction by its use. The excitement stage is

extremely short, and indeed is often absent. In no case in this series did induction require more than forty-five seconds, and in the majority of cases sufficient relaxation was obtained in thirty seconds. With the onset of surgical anesthesia most patients showed a marked rise in the respiratory rate to 40 or 50, a level which was usually maintained throughout the anesthesia. This stimulation of the respirations accompanied general muscular relaxation, and its onset could usually be taken as an indication that sufficient drug had been given to permit starting the operative procedure. However, some patients in the series failed to show this marked stimulating effect, even though unconsciousness and muscular relaxation had been obtained.

The maintenance of the anesthesia at a given level necessitates the continued dropping of vinyl ether, usually at the rate of about one drop per second for the older children and half this rate for infants. After a little experience no difficulty was encountered in continuing the anesthesia throughout the operation. In a few cases salivation was quite marked, and at times it was necessary to remove the mask temporarily and wipe secretions away from the mouth in order to obtain a quiet anesthesia. However, in no patient was the accumulation of secretions sufficient to block seriously the respiratory passages. Eye signs were entirely unreliable, and could not be employed as a guide to determine the depth of the anesthesia. There was often a rolling motion of the eyeballs even though the extremities and abdomen were sufficiently relaxed.

Table 1 *Data from Cases with Vinyl Ether Anesthesia*

Number of patients with vinyl ether anesthesia	160
Number of patients under one year of age	20
Youngest patient	1 mo
Oldest patient	11 yr
Types of operation	
Incision and drainage of abscess	24
Aural paracentesis	19
Endothermy coagulation of hemangioma	19
Urethral dilatation retraction of foreskin external meotomy and so forth	10
Induction anesthetic only — for major operations	5
Esophageal dilatation	4
Suture of laceration	3
Reduction of fracture	3
Miscellaneous	3
Average time for production of surgical anesthesia	30-45 sec.
Average recovery time from removal of mask to return of consciousness	2-3 min.
Average amount of vinyl ether used per case	13 cc.
Number of patients with morphine premedication	17
Number of patients with atropine premedication	33
Number of patients with postanesthetic vomiting	5

\* Not including 3 children with recovery times of 10, 18 and 0 min.

After removal of the mask recovery was prompt, the average patient responding by talking rationally and wanting to sit up in two or three minutes. In only 3 cases was there a recovery period longer

\* Ordered in 10-, 25- and 50-cc. bottles.

## THE USE OF VINYL ETHER (VINETHENE) IN INFANCY AND CHILDHOOD\*

### Report of 100 Cases

ROBERT E. GROSS, M.D.†

BOSTON

THE introduction of vinyl ether (Vinethene) in recent years has made available a new anesthetic which can be particularly adapted for surgical procedures of short duration in infancy and childhood. There has been a long-standing need for a suitable general anesthetic, preferably of an inhalant type, which will produce narcosis rapidly, give adequate relaxation, have a short recovery period, produce little postanesthetic reaction and carry a high degree of safety. All these features appear to be present when vinyl ether is used in adults, and we were therefore prompted to test this drug on younger patients than have heretofore been studied. The following report summarizes our experiences with this anesthetic in 100 babies and children at the Children's Hospital. The results were so satisfactory that the drug promises to assume a permanent place in the armamentarium of one who has occasion to undertake minor operative procedures in young individuals.

In our outpatient department work the use of ethyl ether often causes considerable difficulty because of prolonged recovery periods. In a busy clinic the suture of lacerations, drainage of abscesses, and so forth, under ethyl ether may tie up one or more nurses, who must stay with these patients for an hour or two during the stage of postanesthetic unconsciousness. A similar problem is encountered during the evening or night, when it is necessary to keep some of the personnel on duty while a child slumbers, salivates, vomits, perspires and slowly regains consciousness after having been given a general anesthetic. The use of vinyl ether has greatly changed this situation, and now a child is rarely held more than ten or fifteen minutes after completion of the surgical procedure, for the recovery period is extremely short and the postanesthetic complications are rare.

#### TYPES OF CASES SUITABLE FOR VINYL ETHER ANESTHESIA

Vinyl ether can be used to marked advantage for minor operations which can be completed in five or ten minutes. This limitation on the operative

time is not made because it is unsafe to administer the drug over a longer period, but rather because it is somewhat difficult to maintain an even depth of anesthesia, owing to the extreme rapidity of the action of vinyl ether. Operations have been performed using vinyl ether for half an hour or more, but in such cases careful observation is necessary to maintain the anesthesia on a given plane.

The type of case, then, in which vinyl ether is particularly useful is the one so often encountered in outpatient-department work or in the pediatrician's practice. Within this category may be listed incision and drainage of an abscess or suppurative cervical adenitis, aural paracentesis, dilatation or retraction of a tight foreskin, removal of deeply embedded splinters, dilatation of urethral strictures, external meatotomy, and suture of small lacerations. In a number of cases we have found this anesthesia very useful for endothermy, coagulation of hemangiomas. Sufficient muscular relaxation can be obtained to permit rapid and easy reduction of fractures of the digits or of a Colles's fracture, but more complicated ones had best be treated under some other form of anesthesia. Several times we have attempted dilatation of esophageal strictures under vinyl ether, but this was unsatisfactory, owing to the fact that when the face mask was removed to start dilatation the patient recovered too quickly. In 5 cases vinyl ether was satisfactorily employed as an induction agent (in appendectomy, tonsillectomy, and so forth) because the rapid onset of narcosis was desirable in an excited child. After muscular relaxation was obtained—usually in less than one minute—the vinyl ether was discontinued and was replaced by ethyl ether.

The drug appears to be very suitable for use in even the youngest age groups. Indeed it has distinct advantages in infants because its stimulating effects on the respiratory apparatus ensure an adequate exchange of air and at once dispense with the difficulties in breathing which may be troublesome with ethyl ether and particularly with nitrous oxide anesthesia. We have employed vinyl ether for infants as young as one month, and have been highly pleased with its ease of administration and its apparent safety.

\*From the Surgical Service of the Children's Hospital, Boston.

†Instructor in surgery, Harvard Medical School; surgical resident, Children's Hospital and the Peter Bent Brigham Hospital, Boston.



The experience of all observers who have treated any appreciable number of cases of Type 5 pneumonia has been uniformly favorable. In most clinics, including the Boston City Hospital, the results as judged by the reduction in mortality and the occurrence of rapid clinical improvement have been comparable with or even better than those obtained in Type 1 cases. Experiences with Type 7 and Type 8 cases, on the other hand, have varied widely, most of them have been favorable, and the mortality in specifically treated cases has been lower than that of non-serum-treated cases. One may also include Type 14 pneumonia in infants and young children among those which have given favorable results in clinics where serum has been used extensively.

There are many fundamental reasons underlying the differences in result, and these are in no way different from the circumstances previously encountered in Type 1 and Type 2 cases. Most vital, perhaps, is the lack of adequate experience, that is, the number of cases of the "higher" types in any one observer's experience is too small to make it possible to sift out the necessary important factors, particularly if the data in individual cases are incomplete. Moreover, experience with the production and standardization of these serums, and as a consequence the opportunities for obtaining accurate criteria concerning dosage, are extremely meager.

In dealing with pneumococci of the "higher" types, the difficulties of forming sound opinions multiply enormously. There is great variability among these types with respect to their pathogenicity for man. Very diverse clinical pictures result when they produce pulmonary infections. It is frequently difficult to distinguish in any given patient the type of pneumococcus which is the causative agent in the disease from those which may be habitual or transient residents in the respiratory tract without causative relation to the infection. With a number of these types even material obtained from lung taps, as employed in some clinics, is seldom helpful, since negative results are the rule. Such material is a help in picking out some of the commoner types occasionally missed in the typing of sputum. These and the many unknown factors concerning the serums all contribute to the complexity of the problem. Perhaps the only redeeming feature in this respect has been the recent introduction of the use of rabbit serums, which are making available potent antibodies against most of the types. These products and the development of methods for their standardization may help to solve some of the problems.

What should be our present attitude? In the first place, every effort should be made to acquire the necessary basic information with regard to the frequency of the various types in pneumonia, the bacteremic incidence, the death rates among the various types of pneumonia and the occurrence of the same types of pneumococcus in the respiratory tract under other conditions. For this purpose the present resources may be utilized with only minor expansion. Our state laboratory and several other clinical and bacteriological laboratories are equipped to carry out complete typing of all pneumococci. It is highly desirable that all, or at least most, laboratories offering typing service be equipped to do likewise. The benefits from such a system accrue to all cases, particularly those actually caused by the more frequent and so-called "treatable" types. Errors, and particularly failures, in typing are much less likely to occur if it is required to ascertain the type of pneumococcus in a positive manner, rather than to report negative results when characteristic pneumococci are seen in a specimen and no reaction occurs with the four or five serums at hand. The work and expense entailed may be somewhat more than doubled (group serums are used first, and then the types within the positive group), but this is more than offset by the satisfaction of obtaining positive results on which to base a plan of action. To be sure, one may decide only to obtain another specimen and determine whether the "higher" type predominates, or whether another type is also present which can be identified. Frequently one of the commoner types is found, and may even predominate in the second specimen, particularly if better sputum is available. If this is the case, specific treatment is directed against the frequent type, since it is much more likely to be the causative organism.

The same argument applies, but with considerably greater force, to the advisability of using mouse inoculation\* to supplement direct typing whenever adequate numbers of pneumococci of the commoner types are not seen with the latter method. Examination of the peritoneal exudate of the mouse by the Neufeld method from three to six hours after the inoculation of such sputum or of the early growth from a throat culture will yield a homogeneous suspension of pneumococci with little extraneous material, this considerably diminishes the chances for errors and omissions.

Positive results of blood cultures are of the greatest help. Physicians have been repeatedly and urgently recommended to take frequent

The Massachusetts Department of Public Health is requiring laboratories approved for typing pneumococci to use either mouse inoculation or a satisfactory culture method to supplement direct Neufeld typing.

than four minutes, these periods being ten, eighteen and twenty minutes, respectively. In each of these patients rather large amounts of the drug had been administered. In no case was there any excessive sweating, as is so often seen with ethyl ether anesthesia. Postanesthetic vomiting occurred only five times. The impression was gained that vomiting may have been caused reflexly by collections of saliva in the pharynx during the recovery period, rather than by a central action of the drug.

#### PREMEDICATION

In the first few cases of the series, premedication was given with morphine and atropine. These were calculated for age and weight. It soon became evident, however, that premedication was not essential, and in most of the outpatient-department cases it was subsequently discontinued. Certainly morphine added little to the ease of induction and maintenance of the anesthesia. Atropine, however, while not necessary, diminished the incidence of excessive salivation, so that it was given in cases where it was anticipated that the operative procedure might be somewhat prolonged, it was employed in only one third of our cases.

#### SUMMARY

Vinyl ether (Vinethene) was employed as a

general anesthetic in a series of 100 infants and children ranging from one month to eleven years of age. This drug was extremely satisfactory for minor operative procedures, and in no case was there any alarming or untoward reaction accompanying or following the anesthesia. The extremely rapid induction period with this drug permitted full muscular relaxation in thirty or forty-five seconds. The period of recovery was likewise short, and in practically all cases the patient had regained consciousness in two or three minutes and older children were talking and sitting up by the end of this time. There was postanesthetic vomiting in only 5 cases.

Vinyl ether can be administered in a closed gas machine, mixing the vaporized drug with oxygen, but since the operation in which the anesthetic should be employed is a short one, this method of administration is somewhat cumbersome. The drug can be given easily and quickly on an open mask, and when thus employed in the present series was always satisfactory.

Vinyl ether appears to be the safest and most satisfactory general anesthetic yet produced for operative procedures of five or ten minutes' duration in infancy or childhood. The cost of the anesthetic is moderate, ranging from twenty-five to forty cents for an average case.

## THE USE OF SPECIFIC SERUMS IN THE TREATMENT OF PNEUMONIAS ASSOCIATED WITH PNEUMOCOCCI OF THE "HIGHER" TYPES\*

MAWELL FINLAND, MD†

BOSTON

THE problem of the specific treatment of pneumonias due to the less frequent or "higher" types of pneumococci is a difficult one to discuss with any degree of finality at the present time. This can be easily appreciated when one considers that it took more than a quarter of a century to persuade any large body of physicians to use specific serums in cases of Type 1 pneumonia, in spite of the facts that this organism caused 30 per cent of all cases of primary lobar pneumonia and that an overwhelming body of experimental and clinical evidence supported the therapeutic efficacy of antipneumococcal serum in pneumonia due to this type.

It is best to consider the most frequent of the "higher" types, namely Types 5, 7 and 8, separately. Each of these is sufficiently prevalent so that significant numbers of cases may be accumulated within a reasonable time, enough to indicate the efficacy of any therapy. The data thus far available, both at the Boston City Hospital and elsewhere, already indicate the general character of the results attainable and the difficulties that may be expected. First of all, pneumonias due to the "higher" types may be quite atypical both in their symptomatology and in the character of the pulmonary lesions produced. This is in sharp contrast to Types 1 and 2, which are associated, except in rare cases, with typical lobar pneumonias. Thus a small percentage of cases of Type 5 pneumonia are atypical, but among those due to Types 7 and 8, particularly the latter, the disease may be atypical in a considerable proportion of cases.

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## REPORT ON MEDICAL PROGRESS

### GASTROENTEROLOGY

CHESTER M JONES, M.D.\*

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RECENT studies in gastroenterology have been directed toward obtaining evidence of the correlation between the various parts of the nervous system and the digestive tract, or of a similar influence of the endocrine system on the processes of digestion. Little new has been added, however, that warrants comment in the present review. Certainly, animal experiments to date indicate that injuries in the brain may produce physiologic or anatomic changes in the stomach or intestines. The clinical observations of Oppner and Zimmerman<sup>1</sup> on esophageal, gastric or duodenal lesions in association with cerebral disease would seem to add suggestive confirmatory evidence to such a point of view. Further studies are needed, however, before a satisfactory understanding is obtained of the close relation between cerebral or emotional disturbances and gastrointestinal activity.

Mention should be made of the work of Sandweiss and his associates,<sup>2</sup> who carried out observations on the effect of the injection of anterior-pituitary-like hormone (Antuitrin-S) on the healing of ulcers in Mann-Williamson dogs. The work was inspired by the clinical observation that pregnancy appears to have a beneficial effect on peptic ulcer. Most of the animals treated with the gonadotropic substance failed at autopsy to show evidence of ulcers, or else showed microscopic evidence of healing if an ulcer had formed. The authors conclude rather cautiously that the injection of large amounts of the gonadotropic hormone may have been responsible for the favorable results. Such studies are of extreme importance, and it is to be hoped that proof may be forthcoming that the activity of the digestive tract may be controlled, under proper conditions, through specific hormonal therapy.

Investigations on the physiology of the small bowel have been continued by Abbott, Karr and Miller,<sup>3</sup> Groen<sup>4</sup> and others, but at the present time these are still principally of academic interest. That they will contribute knowledge of extreme practical importance is hardly to be questioned, but for the purposes of this review, they are alluded to merely to point out that continued and important progress is being made in this field of physiology.

#### DISEASES OF THE ESOPHAGUS

Clinical consideration of the esophagus has been largely limited to a renewed interest in the surgical treatment of esophageal carcinoma. In the past three years, seventeen successful resections of the thoracic esophagus have been performed for cancer, and the report of Adams and his collaborators<sup>5</sup> is of interest in this regard. They attacked the problem experimentally and attempted to develop a surgical method consistent with a reasonable prospect of success. Resection of as much as 10 cm of the thoracic esophagus with gastro-esophagostomy was successfully performed in more than half of thirteen experimental animals. The high degree of success attending their operations on dogs determined the authors to attempt a similar procedure in a patient. Operation was successfully performed, and the patient had an entirely uneventful convalescence. Garlock<sup>6</sup> also has reported three successful operations of a similar nature. These results are important in that they may eventually lead to a relatively safe standardized procedure that may be applied to what is usually considered to be an inoperable condition.

#### PEPTIC ULCER

The literature on peptic ulcer is voluminous and consists mainly in clinical reports and discussions of various therapeutic measures, but it is still obvious that an entirely satisfactory method of treatment remains to be found. One important paper is that of Crohn and Schwartzman,<sup>7</sup> who present an interesting study on ulcer recurrences associated with infections of the upper respiratory tract. The authors propose that the Schwartzman phenomenon is operative in such recurrences and believe that a state of reactivity is set up in patients with ulcer by secondary bacterial invaders. Several examples of ulcer recurrence, especially with hemorrhage, are cited in association with intercurrent infection of the respiratory tract. Although this clinical observation is not new, the authors are wise in calling attention to the importance of the underlying mechanism and to the necessity for special care in the treatment of patients with ulcer during such infections. Other clinical observations of some importance are those of Mixer<sup>8</sup> and Jones,<sup>9</sup> who report cases of ulcer of the posterior wall of the duo-

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blood cultures during the acute stage of pneumonia. The results of such cultures are the best available guides to proper diagnosis and prognosis and the conduct of serum therapy, and serve as the best safeguard for the interpretation of the results of the typing of sputum. In any patient with pneumonia, the discovery in the blood culture of a growth of pneumococci which are identified with any of the "higher" types is the best available indication for specific treatment, provided serum for that type can be obtained. The probable mortality in bacteremic cases is extremely high without serum, and specific antibody offers perhaps the best hope of obtaining a cure.

In cases with sterile blood cultures, or before the results are available, it is best to consider all the facts at hand. The severity of the disease, the age of the patient, the character of the material from which the sputum was obtained, the number of organisms of that type seen and the relative number and character of other organisms present (as seen in the Neufeld preparation and in a gram-stained smear) will all influence the decision. If an infrequent type, or a common mouth inhabitant, such as Type 3 or Type 6, is obtained in small numbers from a poor specimen, or if other organisms predominate, it is best to obtain a second and better specimen in order to ascertain the relative numbers of the pneumococcus in question. At times, if part of the same specimen is sent to a second laboratory, it may be discovered that a common type was missed owing to errors in technique or interpretation or to deterioration of the typing serum. In acutely sick patients with good sputum raised from the bronchi, particularly if it

is rusty, the discovery of a given type as the only or definitely predominating organism is adequate indication for specific serum, and its proper employment will probably increase the chances of rapid recovery.

Further experience may reveal that certain of the types are more regularly and intimately related to pneumonia than are others. Already it appears that a greater proportion of Types 4, 12 and 18 pneumococci, for example, are causative agents in pneumonia than are those of Types 6, 10, 20 and types "higher" than Type 20. This is only relatively true, however, since probably every type may cause severe and even fatal pneumonia under the proper circumstances or in a particular individual.

What has been said refers to the employment of specific serums. As for the use of the newer chemotherapeutic agents, their field of usefulness has not been thoroughly explored. There are so many difficulties and even dangers associated with their use, and the data concerning the exact limits of their value are so inadequate, that one is justified in refraining from utilizing them in cases of pneumonia except under ideally controlled conditions. Exact clinical and bacteriological studies, including blood cultures, and the complete typing of pneumococci and even cultures of sputums, should be made in order to be able to define the merit of such agents or to detect the conditions under which they fail, and in order to be prepared to cope with such conditions. Such data, obtained at the earliest moment, will place the physician in a position to use specific serum as soon as it becomes apparent that the patient is not responding to or cannot tolerate the chemotherapeutic agent.

who were treated with the drug. It is still too early to evaluate the results of such medication as that reported by Metz and Lackey, but at present one should be content to regard this latest addition to the treatment of ulcer as an interesting attempt to correlate certain known physiological facts with the manifestations of a chronic disease.

The question of surgical measures in relation to peptic ulcer and its complications still raises many controversial points of view. It is obvious that the ideal operation applicable to the ulcer patient is still a matter of individual opinion, which ranges between rather wide extremes. For the most part, surgeons lean toward a conservative type of surgery in the treatment of perforated ulcer, although many Continental surgeons advocate subtotal gastrectomy as the method of choice. A similar divergence of opinion exists in a consideration of the immediate treatment in cases with massive hemorrhage from ulcer. Not only is there no unanimity of opinion regarding surgical intervention, but even in those cases in which surgery seems to be indicated there is a wide discrepancy between those advocating relatively simple surgery and those demanding subtotal removal of the stomach as the only logical procedure. In this country, for the most part, the conservative measures seem to be more favorably considered than are the extreme ones. Reference to various articles that have appeared during the year does little to clear up the confusion arising from these divergent views, but it is worth while to suggest the soundness of the opinion expressed by Cutler,<sup>17</sup> who comments on the type of operation to be employed in cases where surgery is indicated. In a review of the surgically treated patients at the Roosevelt Hospital between the years 1934 and 1937, he states that the following guiding principles in the choice of operation have been evolved: (1) the operation must be of such a nature that the particular patient can tolerate and survive it, (2) not only should it aim at the alleviation of symptoms, but it should give freedom from the likelihood of complications, both early and late, and (3) the ideal operation having been determined, it should be abandoned if the lesion found so indicates. One might add as a fourth desideratum that in deciding for or against surgery in such patients, the final conclusion should rest on a balancing of risks, namely the risk of operation as opposed to the risk of a continuation of non-surgical measures.

A renewed interest in the optimal treatment for the ulcer patient suffering from massive hemorrhage can be observed in the literature for the last two years, and as indicated above, there is a wide divergence of opinion as to therapeutic

measures. There can be little doubt, however, that the experience of most observers warrants one in assuming that the patient should be treated by careful medical measures except on rare occasions. Certainly in the group of patients under fifty years of age, conservative measures are indicated, and the application of detailed treatment similar to that advocated by Meulengracht usually gives good results. There is no doubt that we have definitely withdrawn from a policy of withholding food from a patient with a bleeding ulcer, although it still may be wise to accept Meulengracht's very liberal regime with some reservations. There is also no doubt, however, that occasionally in the younger group and certainly among those patients over the age of fifty, surgical measures must be resorted to in order to save the lives of individual patients. It should be a matter of routine for both the physician and the surgeon to see patients suffering from massive hemorrhage, in order to arrive at an early and correct decision in individual cases. Two excellent epitomes<sup>18</sup> of this somewhat troublesome problem are well worth reading. In the final analysis, no routine procedure will constitute a satisfactory approach in every case, but in each instance it should be a matter for individual decision.

Another point that has received much attention is the question of vitamin C deficiency in the disease under discussion. Without reference to specific articles, it is sufficient to comment on the fact that, according to present standards, vitamin C deficiency is the rule rather than the exception in patients with ulcer. It is in no way specific of the disease, but is common in many cases where dietary limitation or emaciation exists. As yet there is no evidence that vitamin C lack has any absolute etiologic importance in the causation of the disease, nor has any proof been brought forward up to the present time that the administration of vitamin C is of other than general importance in patients with ulcer. The particular exception to this statement may be found in the suggestion that in patients requiring surgical procedures, vitamin C lack should be treated adequately in order to provide for proper healing and an uneventful convalescence.

Any consideration of the problem of ulcer should include a comment on the complication of perforation. Although the idea is not in any way new, an interesting diagnostic comment is found in the studies by Paune and Rigler,<sup>19</sup> who made observations on 13 patients incidental to the production of diagnostic pneumoperitoneum. They demonstrated on these patients, as well as on 5 cadavers, that at times as small a quantity of gas as 5 cc could be demonstrated roentgenologi-

denum in which pain in the back was the sole or predominating symptom. These cases are of especial interest inasmuch as they are usually seen as orthopedic or neurological problems until some complication, such as hematemesis, makes it apparent that an ulcer exists.

Modifications in the treatment of ulcers fall under two headings—medical and surgical. Of the former, the majority, as usual, are concerned with the employment of measures directed toward reducing gastric acidity. The use of aluminum hydroxide gel has been reviewed by Emery and Rutherford<sup>10</sup> and Beazell, Schmidt and Ivy,<sup>11</sup> among others. The former, in using this preparation, have found that the symptoms of ulcer appear to be readily relieved by its administration, without any interference with the acid-base balance. There appears to be slight absorption from the gastrointestinal tract, but undoubtedly this preparation avoids all danger of producing alkalosis. They at first employed the drip method suggested by Woldman, but subsequently found that the oral administration of the drug was efficacious. This is of some importance inasmuch as it simplifies the entire procedure for the average patient, and it is quite probable that the drip method of treating ulcer should be limited to those patients who fail to respond to ordinary measures. Ivy and his associates were unable to produce evidence that aluminum hydroxide interfered with absorption in the gastrointestinal tract.

Further reports on the use of magnesium trisilicate by Tidmarsh and Baxter<sup>12</sup> indicate that it is a useful preparation which aims at neutralizing or absorbing gastric acidity without altering the pH of the blood. These authors added atropine and phenobarbital to the magnesium trisilicate and found the preparation of value in that it brought about restful nights, lack of apprehension and normal intestinal function. An ingenious combination of dried milk and calcium carbonate has been devised by Wosika<sup>13</sup> and consists in compressed tablets, combining the advantages of milk feedings and the use of alkali. The chief asset of the preparation is its small bulk, which makes it possible for the patient to carry the tablets in his pocket.

Several attempts have been made to control the symptoms of ulcer by the use of bile or bile acids, with varying success. The best recent estimate of this form of therapy is that of Emery and Schnitker,<sup>14</sup> who treated a group of 40 patients with desiccated ox bile over periods of two years. The basis of such treatment lies in the fact that the diversion of bile from the duodenum in animals is an important detail in the experi-

mental production of ulcer. In the group of patients that were treated with adequate doses of ox bile, a satisfactory relief of symptoms occurred in approximately half the cases, a proportion that is not much better than that of spontaneous cures, as the authors aptly remark. They also conclude that the results seem to rule out disturbances in biliary secretion as a cause of peptic ulcer in man. The above measures, in reality, represent no radical departure from accepted methods of treatment, but differ only in the details of attempting to reduce gastric acidity by medicinal preparations.

In view of the publicity in the lay press attached to the treatment of ulcer with posterior pituitary extract, as reported by Metz and Lackey,<sup>15</sup> it is important to comment on their work. Several investigations have been carried out since the original studies by Hess in 1920 on the influence of hypophyseal extract on gastric secretion, and a preliminary report on the use of posterior pituitary extract in the treatment of ulcer was presented by Metz and Lackey<sup>16</sup> in 1937. In the recent report, observations were made on 28 individuals suffering from peptic ulcer. Complete symptomatic relief was obtained in 24 patients within three weeks following the administration of a fresh preparation of the posterior pituitary gland, administered hypodermically, orally or intranasally. The latter route was preferred because of the absence of undesirable side-effects and because of the more certain utilization of the drug. The authors advance the hypothesis that many patients with peptic ulcer exhibit symptoms of pituitary deficiency, an assumption based largely on the fact that 15 of their patients had definite polyuria and nocturia which responded more or less successfully to the treatment. They further state "Recurrences of ulcer healed under pituitary administration are to be expected, since this therapeutic agent probably relieves temporarily a deficiency." As further support of their theory, they report that they were able to confirm the findings of Dodds and others to the effect that pituitrin increases the secretion of gastric juice in dogs following stimulation with histamine. The subjective relief of the symptoms of ulcer by the intranasal insufflation of posterior pituitary extract would thus seem to add another method to our armamentarium. One is forced to recall the fact, however, that almost any striking method of treatment of peptic ulcer has always been associated with transient benefit. In this respect, it is important to recall the experiments of Sandweiss and others on the parenteral injection of histidine, during which it was found that control patients treated with sterile solutions of physiological saline were benefited as readily as those

who were treated with the drug. It is still too early to evaluate the results of such medication as that reported by Metz and Lackey, but at present one should be content to regard this latest addition to the treatment of ulcer as an interesting attempt to correlate certain known physiological facts with the manifestations of a chronic disease.

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cally in the right subphrenic space. In nearly one fifth of a series of 38 cases of perforation of the stomach or duodenum, free gas was observed by this method, and the suggestion of the authors that in doubtful cases a careful search for small, localized collections of gas under the diaphragm may be of real diagnostic value is a very pertinent one.

#### DISEASES OF THE ILEUM

An interesting clinical report on disease of the small bowel is found in an article by Wolpaw,<sup>20</sup> in which he describes 3 cases of ulcerative hyperplastic tuberculosis of the small intestine. Although this is occasionally a cause of intestinal obstruction, its rarity, together with the fact that, as a rule, it exists without any evidence of active pulmonary disease, makes the report of importance. This is particularly so because a reasonably early diagnosis of the condition may frequently be accompanied by successful surgical removal of the local lesion. Charr and Cohen<sup>21</sup> determined the incidence of intestinal tuberculosis in necropsy studies of patients dying from tuberculous anthracosis and in those who died of pulmonary tuberculosis without anthracotic involvement. The incidence of intestinal tuberculosis was approximately 50 per cent among the latter, whereas it occurred in only 20 per cent of the former. A review of the therapeutic aspects of the treatment of intestinal peritoneal tuberculosis is presented by Mayer and Dworkin,<sup>22</sup> who point out the excellent results frequently obtained by the cautious use of x-ray therapy and the enthusiastic use of ultraviolet therapy.

The frequent appearance of clinical articles on regional ileitis does little to clarify the situation so far as therapeutics is concerned. The clinical aspects of the condition are now fairly well recognized by the profession, and the increasing accuracy of x-ray visualization of the small bowel has contributed appreciably to diagnosis. The clinical variations in the course of the disease are becoming somewhat clearer, although at times one is led to wonder whether enough attention has been paid to the cyclic changes which are almost as typical of this condition as they are of idiopathic ulcerative colitis. To date, studies as to the etiology of the disease have been inconclusive. So far as the literature is concerned, surgical treatment has occupied the place of importance, and radical resection of the involved areas of the bowel is still the chosen method of many who are interested in the problem. Because of the suggestive clinical and experimental evidence that the disease originates in the mesenteric lymphatics, Mixer

and Starr<sup>23</sup> believe that the successful results following resection of the affected ileum depend primarily on a wide excision of the involved mesentery and its lymph nodes. They also think that failure to carry out this type of excision may bear a definite relation to the recurrences frequently observed after surgical treatment. A more conservative point of view is expressed by Kross,<sup>24</sup> who briefly reviews the results in 3 cases. In one case, only the appendix was removed, the diseased bowel being left undisturbed, in the second, treatment consisted of an enterostomy, and in the third, a side-tracking colostomy was performed. These cases had no recurrences during periods of five and a half, four and three quarters and one and a quarter years respectively. In the opinion of the reviewer, there is still room for grave doubt as to the efficacy and, frequently, as to the wisdom of surgical procedures in this disease, except for specific indications such as obstruction, fistula formation, and the like. There is little doubt that intensive general medical care in many instances comprises the only method necessary for restoration to comparatively complete health. At the present time too few cases have been followed over sufficiently long periods of time to warrant any conclusive opinions as to the value of either medical or surgical procedures.

The question of the amount of small bowel that can be safely resected is particularly pertinent to the subject of ileitis, and since the end of the nineteenth century various studies have appeared on food absorption in patients with portions of the bowel removed. West and his associates<sup>25</sup> present such a report, with studies on digestion and absorption in a man with but 90 cm of small intestine. This patient had had five resections of the small bowel performed over a period of eleven years, with less than 30 cm of jejunum remaining. At exploration, several months prior to the metabolic studies, the remaining small bowel was found to be dilated and hypertrophied almost to the size of the normal large intestine. It was found that under the existing conditions about 25 per cent of the ingested protein and 45 per cent of the fat were lost in the feces, representing roughly 25 per cent of the calorific value of the ingested food. Practically all the carbohydrate in the diet was absorbed and utilized. A high calcium and viosterol intake was necessary in order to keep the man in a positive calcium balance, and with what was apparently only about one sixth of the small bowel remaining, a fairly satisfactory existence was possible. Fat absorption appears to be the chief factor necessitating any



thing like the normal length of small bowel. The regulation of diet in this case may well be utilized as a guide to the dietary treatment of similar conditions.

#### APPENDICITIS

A survey of the literature for the year reveals an unusually large number of articles dealing with the subject of appendicitis. Renewed interest in this subject is obviously of importance in view of the general feeling that mortality from this disease is still unnecessarily high. The diagnostic and therapeutic aspects of the problem have been stressed. Flannery,<sup>28</sup> for example, after a study of the records of 440 cases, emphasizes two well-known but important points: the increased mortality following the administration of catharsis for acute abdominal symptoms, and the importance of deferring operation in those patients where a diffuse peritonitis is suspected. Collins,<sup>27</sup> in a review of over 3000 consecutive appendectomies, encountered 751 instances (25 per cent) of acute retrocecal appendicitis. He points out the difficulties of this diagnosis and again emphasizes the dangers attending the administration of laxatives. Of some interest is his discussion of the variation in the localization of pain experienced by various patients in this large group. One hundred and thirty-seven patients complained of epigastric or right hypochondriacal pain, without any localization at McBurney's point, 214 complained of right lumbar pain, 88 experienced pain in the right shoulder, and 107 had severe pain in the upper part of the abdomen which continued for over six hours. Only 142 patients presented the clinical signs of acute appendicitis. Correct preoperative diagnoses were made in only two thirds of the cases.

Bower and his associates<sup>28</sup> analyzed the causes of death in acute appendicitis and estimated that 92 per cent were due to peritonitis. Almost 90 per cent of those admitted to the hospital with spreading peritonitis had received one or more doses of laxatives. The mortality of the group was 115 per cent higher than that of the group who had not received aperients. The article is extremely critical in its survey of the treatment of the symptoms of those patients presenting localizing or spreading peritonitis.

The numerical importance of appendicitis among college students has received attention in recent years, and an illuminating article is that of Schmidt and Joachim,<sup>29</sup> who reported on 1303 cases of appendicitis encountered in students at the University of Wisconsin. Von Mikulicz-Radecki<sup>30</sup> investigated the relation between appendicitis and female

sterility. He considers that appendicitis is the cause of sterility in every seventh case and that it takes the third place among all the causes of this condition. He advisedly warns surgeons against drainage of Douglas's pouch and also against intervention in the uterine adnexa in the course of appendectomies. Låwen<sup>31</sup> discusses in rather interesting fashion the relation between what he termed in 1914 "fibroplastic appendicitis" and terminal or regional ileitis. Although the discussion involves rather arbitrarily the classification of various clinical and pathologic pictures, the article is of importance in that it calls attention to the not infrequently incorrect diagnosis of appendicitis in the presence of ileitis.

The question of the chronic appendix continues to receive consideration, but little if anything new of importance has been presented. An undoubtedly correct point of view is that of Swalm and Morrison,<sup>32</sup> who plead for a conservative attitude toward appendectomy for chronic appendicitis. They stress particularly the frequency with which this condition is incorrectly diagnosed in the presence of a spastic, irritable or unstable colon. Reference should also be made to a thoughtful study by Shelley<sup>33</sup> of 881 cases of "chronic appendicitis." Shelley believes that he has adequate evidence that such a clinical entity exists, but emphasizes the extreme importance that should be attached to a definite localization of physical findings and to the nature and frequency of attacks. Although presenting an obviously surgical point of view, the author is extremely careful to insist on the utmost diagnostic care in ruling out other conditions simulating appendicitis. The article is well worthy of careful perusal.

#### INTESTINAL OBSTRUCTION

Intestinal obstruction continues to be of interest from the point of view of investigation and treatment. Numerous contributions on the use of Wangensteen decompression or drainage by the Abbott-Miller tube are of interest but present little that is new. Proponents of these methods frequently stress the value of such procedures without calling attention to the difficulties attending their use.

Although there is little, if anything, new regarding x-ray diagnosis of complete or partial intestinal obstruction, the importance of this diagnostic procedure is very properly emphasized by Solis Cohen and Levine.<sup>34</sup> They stress the extreme diagnostic importance of flat or survey films of the abdomen in the early stages of acute intestinal obstruction and the need for examining patients

in the prone, supine and upright positions. With other roentgenologists, they agree that the absence of a step-ladder appearance does not rule out an ileus and indicate that they consider the appearance of trapped gas and hairpin turns as among the earliest signs of acute intestinal obstruction. Although it is true that there may be an over-emphasis on such diagnostic procedures to the detriment of an ordinary careful physical examination, it is equally true that many physicians are still unaware of the diagnostic help that can be obtained from the roentgenologist in this serious condition. Excellent illustrations accompany the article.

The diagnosis and treatment of intussusception by non-surgical means has received considerable attention. Björkroth<sup>35</sup> stresses the diagnostic as well as the therapeutic value of the opaque enema. In recent years the good results obtained by manipulative and surgical means are due to early diagnosis. The partial disinvagination brought about by an opaque enema makes subsequent surgical correction easier. Povlsen,<sup>36</sup> in reporting on a case of intestinal invagination, also emphasizes the therapeutic value of long-continued high enemas, with bloodless reposition of the bowel under roentgen control. A similar report, given in somewhat more detail, is that of Orfila and his collaborators.<sup>37</sup> These authors report the successful treatment of 10 cases of intussusception occurring in infants and children ranging from three months to four years in age. Under barium enemas, usually given without anesthesia, and under roentgen control, disinvagination generally took place, as evidenced by the passage of barium into the ileum. All types of intussusception in the ileum may be reduced by barium enema and roentgen control, the only contraindication being that of a late diagnosis.

#### ULCERATIVE COLITIS

The subject of ulcerative colitis, as usual, has received a good deal of attention. It is becoming apparent that the nature and history of the disease are more clearly understood than they were in recent years. Its etiology is still unknown, although various workers have attempted to find the causative organism. There is nearly complete agreement that the diplostreptococcus of Bergen is at best a secondary invader, and attempts to prove that *Shigella dysenteriae* is a responsible agent are still far from convincing. A very excellent symposium on the entire subject was presented by Mackie,<sup>38</sup> T. E. Jones<sup>39</sup> and Willard and his associates.<sup>40</sup> In these three articles the question of therapy is well covered from the points of view of both the medical and the surgical ap-

proaches. A perusal of the three papers and the discussions in this symposium will be of real value to anyone interested in this disease—a malady which presents one of the most difficult therapeutic problems of the day. The conclusions in Mackie's paper may well be quoted:

Chronic ulcerative colitis appears to be the complex expression of the interaction of several different factors. The disease exhibits an inherent tendency to progression and relapse. Although the prognosis under medical management is good in the pathologically mild and moderately advanced case, the term 'apparently arrested' should be substituted for 'cured.' Prolonged joint medical and surgical observation is essential for the pathologically advanced case. Combined medical and radical surgical treatment offers the best prognosis for many of the pathologically advanced cases.

Jones comments on the extremely bad prognosis in the so-called fulminating form of the disease, a type that usually can be recognized by the curious velvety, diffusely oozing appearance of the rectum and rectosigmoid by sigmoidoscopy. Such cases, as a rule, respond very badly to either medical or surgical measures. Among other important points in the paper by Willard and his collaborators, attention is called to the fact that the extent of x-ray involvement does not constitute a reliable prognostic sign. One cannot escape the conviction that ileostomy and colectomy are the only surgical procedures of choice in an important group of patients suffering from ulcerative colitis. The reviewer would like to point out the absolute necessity for a very close correlation between medical and surgical management in these patients, who present all the extreme manifestations of deficiency disease and chronic infection.

One point of therapeutic interest is the appearance of articles on the use of sulfanilamide or sulfanilamide derivatives. With the widespread use of these preparations, it was to be expected that a chronic disease of the clinical importance of ulcerative colitis would before long have been treated by sulfanilamide medication. The use of Neo-prontosil (di-methyl-di-sulfanilamide) on 12 cases of ulcerative colitis is made the basis of a preliminary report by Bannick and his associates<sup>41</sup> from the Mayo Clinic. Apparently in the milder cases there was a prompt subsidence of symptoms following the use of the drug, which suggested that it had been responsible for the clinical improvement. The authors recognize, however, the characteristic occurrence of spontaneous remissions and are extremely cautious in drawing any conclusions. They suggest that the drug may be useful in mild cases and that it may help bring about improvement in the underlying condition. Further studies with this particular therapeutic agent will be of extreme interest.

## AVITAMINOSIS

The relation between avitaminosis and disorders of the digestive tract continues to attract widespread interest, and numerous articles have appeared dealing with various phases of this subject. The relation of vitamin C deficiency to peptic ulcer and other disorders has already been commented upon. Two authoritative articles by Cowgill<sup>42</sup> should be read by all interested in the treatment of patients who are apparently suffering from lack of vitamin B<sub>1</sub>. In these articles Cowgill discusses the requirements of the normal adult and child, mother and infant, and pays particular attention to the loss of vitamin B<sub>1</sub> through excretory channels. This last consideration is of extreme importance from the point of view of the widespread therapeutic use of crystalline vitamin B<sub>1</sub>. Not only is there an appreciable loss of this substance in the presence of pronounced diuresis, but also as a result of diarrhea. In patients suffering from diarrhea, evidence of the lack of this vitamin is frequently noted, and Cowgill's suggestion that the adequate administration of vitamin B<sub>1</sub> can be obtained only by parenteral use is timely and important.

Further observations on the value of nicotinic acid have appeared during the year. Of these, the most important are those of Spies and his collaborators,<sup>43</sup> together with a similar article by Matthews.<sup>44</sup> All these observers agree as to the remarkable efficacy of nicotinic acid in the treatment of pellagrous glossitis, stomatitis, vaginitis, urethritis and proctitis. Its effect seems to be more marked on these conditions than on the neurologic symptoms of the disease. Vilter, Bean and Spies, in one of the articles cited above, attempted to substitute dimethyl dimicotinic or dimicotinic acid for the original preparation in severely ill pellagrins. The physiologic response to these drugs was quite different, in that the flushing reaction and a rising cutaneous temperature did not occur, but these two drugs had only a partially beneficial effect on the symptoms of pellagra, and the authors believe that neither should be utilized as a substitute for nicotinic acid. They also stress the fact that protein deficiency in pellagra is of more importance than is currently supposed.

## GASTROSCOPY

The most important addition to our methods for the diagnosis of disease of the stomach—gastroscopy—has been thoroughly reviewed during the past year. Few, if any, new observations have been added to the large number already made by Schindler, Benedict and numerous others. A comprehensive summary of the entire subject, com-

menting on the role of gastroscopy in the recognition and identification of lesions, has recently been presented by Schindler<sup>45</sup> and constitutes an authoritative article for those interested in this extremely important subject. There is little doubt that this procedure has already made possible careful studies of gastritis, a condition that for some time has been misunderstood and improperly diagnosed. The causes of previously unexplained hemorrhage from the stomach can undoubtedly be visualized by the use of the gastroscope, and with the accumulation of sufficient observations on normal and abnormal stomachs, the relation between various forms of gastric irritation and gastric symptoms will become much more clear. That gastroscopy will ever prove the final arbiter in a differential diagnosis between benign and malignant lesions of the stomach in difficult cases is to be greatly doubted.

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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25081

#### PRESENTATION OF CASE

*First Admission* A sixty-year-old married, American railroad inspector was admitted complaining of nausea, vomiting and weakness of three hours' duration.

On the afternoon of entry the patient had a very sudden onset of weakness and faintness followed by nausea and vomiting. The vomitus consisted of recently eaten food. He had had such attacks occasionally since childhood. During the past two years he had been having attacks of palpitation and weakness with substernal pressure, relieved by lying down. One year before admission a consultant advised digitalis, which was used for a while and stopped because no evidence of cardiovascular disease, other than arteriosclerosis, could be found by the patient's physician. He soon began to feel under par and resumed the use of digitalis. There was never edema or any other sign of cardiac decompensation.

His father had died at fifty-seven of Bright's disease. One brother had had a "shock" ten years previously, after which he remained paralyzed. His past and family histories were otherwise non-contributory.

Physical examination showed a large, slightly cyanotic, restless man. The heart was not enlarged. There was a moderately sharp first sound, and a systolic murmur at the apex which obliterated the second sound. A diastolic murmur was heard at the base, most marked to the left of the sternum. There was an occasional dropped beat. The blood pressure was 80 systolic, 60 diastolic. The remainder of the physical examination was essentially negative.

The temperature was 100°F, the pulse 90, and the respirations 20.

The urine examination showed a green test with Benedict's solution, a positive diacetic acid test, a negative acetone test, and 2 to 4 white cells and many hyaline casts per high-power field. The blood showed a red-cell count of 5,400,000 and a white-cell count of 11,200. A blood Hinton test was negative. The fasting blood sugar was 111 mg per cent. An electrocardiogram showed a normal rhythm, a rate of 70, diphasic T waves in

all leads, a slurred QRS and left-axis deviation. X-ray films showed a small diverticulum on the left side of the lower end of the esophagus, just above the hiatus. The remainder of the gastrointestinal series and a barium-enema examination were negative. The kidney outlines appeared normal.

The patient's blood pressure returned to 125 systolic, 75 diastolic, on the second hospital day. A second-stage gastric diet, tincture of belladonna, phenobarbital and Amytal were prescribed and the patient rapidly improved. He was discharged on the eighth hospital day.

*Final Admission* (four years and eight months later) About a year before readmission the patient began to lose weight. Four months later he was advised to stop work because of shortness of breath, loss of energy and malaise. Six months before entry he had gained strength, his appetite had improved, and he was able to walk three miles some days with very little shortness of breath. He returned to work three months before admission but was forced to stop after three weeks when nausea, loss of appetite and dyspnea developed. He vomited almost daily during the following month. Two months before entry he vomited a tumblerful of blood, but none since. Marked weakness developed, and he lost his appetite completely. His stools remained normal. He had been taking digitalis and kept on until five days before entry. At this time he developed a marked tachycardia, — about 180, — and quinidine was given in full dosage for three days with slowing of the pulse rate. A year before admission he weighed 170 pounds, at the time of entry, 140 pounds.

Physical examination showed dehydration, emaciation and weakness, as well as slight jaundice. The heart was enlarged. There was an early blowing diastolic murmur best heard at the apex. The apical systolic murmur was high pitched. The aortic systolic murmur was rather rough. A<sub>2</sub> was diminished. The blood pressure was 90 systolic, 60 diastolic. The lungs were clear. There was tenderness in the right upper quadrant of the abdomen, with voluntary spasm. The liver edge was palpable 2 cm below the right costal margin. There was slight edema of the thighs and feet.

The temperature was 100°F, the pulse 80, and the respirations 24.

The urine examination showed a trace of albumin and a specific gravity of 1.023, with many hyaline casts, a rare coarsely granular cast, a rare red cell and an occasional white cell per high-power field. It contained no sugar, bile, acetone or diacetic acid. The blood showed a red-cell

count of 5,400,000 with 90 per cent hemoglobin, and a white-cell count of 12,800 with 86 per cent polymorphonuclears. The nonprotein nitrogen of the serum was 72 mg per cent, the chlorides 106 milliequivalents, and the protein 6.4 gm per cent. A blood Hinton test was negative. A stool examination was negative. An electrocardiogram showed left bundle-branch block and partial A-V block. The P-R interval was 0.25 second.

X-ray films showed a normal esophagus. The upper gastrointestinal tract appeared normal.

On the fourth hospital day the patient was better, he did not vomit and was able to take some nourishment by mouth. On the fifth day there was edema of the right hand. Intravenous fluids had been given in the right arm, but there was no definite evidence of thrombophlebitis. Examination of the heart showed auricular fibrillation. The patient felt much better, but complained of nausea. An electrocardiogram at this time showed definite changes in the P waves and slight changes in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>. T<sub>1</sub> was inverted, T<sub>2</sub> diphasic, T<sub>4</sub> inverted, S-T<sub>1</sub>, S-T<sub>2</sub> and S-T<sub>4</sub> slightly low, S-T<sub>3</sub> slightly elevated. The QRS complex was slurred. P<sub>1</sub> was inverted, P<sub>2</sub> and P<sub>3</sub> diphasic. The P-R interval was 0.18-0.20 second. One day later the patient felt better. The liver seemed to be enlarged, and there was still definite jaundice. On the following day a van den Bergh showed 7.6 mg per cent of bilirubin. The lungs were clear.

During the next few days the patient seemed to lose ground. On the fourteenth hospital day his legs and thighs showed some increased edema. Itching of the skin was present, and few hemorrhagic blebs were seen on the hands and forearms. The hands were edematous. On the following day the patient was very weak. The lungs were clear, the heart and the edema unchanged. On the sixteenth day the patient was much worse. There were coarse rales at the right base. The liver seemed unchanged in size. During the previous two days the temperature had gradually risen to 105°F. Respirations rose to 50, the pulse to 140. The temperature had remained essentially normal since entry except for a rise to 101°F on the fifth day. The patient rapidly failed and died on the sixteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. WYMAN RICHARDSON. I said not long ago that I had been caught too many times on a diagnosis of calcareous aortic stenosis and I am not going to be caught this time. I may be wrong, but "right off the reel" I am going to make that diagnosis. At least we can say that he certainly had heart disease, and the question is, Could this

whole picture be explained by heart disease or must we make some other diagnosis? As you know, on the basis of statistics Dr. Cabot always tried to make one diagnosis explain the whole story, but Dr. Mallory tells us that when dealing with old patients it is perhaps better to make as many diagnoses as we can to fit the symptoms.

To go over very briefly the first episode of rather sudden collapse, with vomiting and weakness, we are not helped at all by knowing that he had had such attacks occasionally since childhood. I shall point out that he had a diverticulum of the lower esophagus and possibly that might have accounted for them. It is known that patients with aortic stenosis of the calcareous type do have a variety of queer symptoms, and one sees not infrequently attacks of syncope and weakness of sudden onset coming out of a clear sky without prodromal symptoms. This whole first episode could be considered, I think, as a heart attack. The only question is, in view of the fact that later on he vomited blood, whether he had bleeding which was not recognized at that time. I considered this point but could not find any other evidence for it, so I am assuming that this attack of weakness was due to his heart. The description of the signs in the heart I shall not go over again, but he was known to have had a diastolic murmur of the aortic type and a loud systolic murmur said to have been heard better at the apex than at the aortic region.

In regard to the laboratory examination, I want to point out one thing—the positive test for diacetic acid. The diacetic acid test in this hospital presumably means the ferric chloride test for acetone bodies, and the acetone test refers to the sodium nitroprusside test. The latter test for acetone bodies is much more sensitive than the ferric chloride test. We should consider the positive diacetic acid test in this case to be a "false positive."

We have x-ray films of the gastrointestinal tract, and they are negative. One rather curious thing about this work-up is that nobody apparently was interested in taking an x-ray film of the heart.

The patient got along pretty well until about four years later and then another train of symptoms developed—weakness and weight loss, together with more vomiting than before, and dyspnea and signs that may be attributed to his heart failure. The physical examination was not very different, except for jaundice and a tender liver edge. The urine examination was consistent with passive congestion in the kidneys, with a fairly good specific gravity, and we do not have to as-

sume that he had renal failure to account for the edema and other symptoms

One interesting point in the laboratory findings is the blood chloride of 106 milliequivalents. He was probably somewhat dehydrated, but even so, one would expect with this amount of vomiting that his chlorides would have been lower than that. It does not help us any, but it leads one to suspect that he had an achlorhydria. The stool examination was negative as regards blood. I want to point out that there was no bile in the urine.

The patient failed rather rapidly. If you are going to try to make another diagnosis to cover such a lot of symptoms, there is nothing that points, so far as I am concerned, in any one direction, except that there was something that was affecting the liver to cause jaundice. If you are going to make such a diagnosis you have to refer to malignant disease of some sort. You can place it anywhere. You might have malignant disease of the pancreas with metastases to the liver. On the other hand, we know of patients with heart disease at this age and older who do lose a lot of weight because of heart disease—I presume because of congestion of the organs, and so forth. The electrocardiogram I have left strictly alone. Perhaps someone will comment on it later. To me, it means that there was considerable involvement of the heart.

I am going to say that this man's primary difficulty was heart disease, that he had calcareous aortic stenosis with some regurgitation and that he also had involvement of the coronary vessels, perhaps at their orifice, with consequent myocardial damage. In my experience these patients have rather bizarre symptoms, with dyspnea as a prominent feature, and once they begin to be dyspneic, they do not respond to the usual cardiac drugs or measures of treatment. Then, I am going to say that he had passive congestion of the liver. I am not going to talk about cardiac cirrhosis of the liver, and I see no reason to suppose that he had any other kind of cirrhosis. I am not going to talk about other types of liver disease. I am going to say that he had passive congestion of the kidneys and, finally, that he died with a local disease in the lungs. He probably had a terminal bronchopneumonia because the signs appeared localized on one side and were followed by a rapid rise in temperature. Whether we have to think of the question of emboli or pulmonary infarcts, I do not know, but I am going to leave that alone too. If there are x-ray films of the chest I think it would be fair to see them.

DR. TRACY B. MALLORY: None were taken during life.

DR. RICHARDSON: If one had been taken you might have been able to see the aortic valve.

DR. AUBREY O. HAMPTON: I have a postmortem film of the chest. I should like to know what might have happened if you had seen it, because a round mass at the right base is very interesting. His heart does look enlarged. This film is not good enough to show a calcified heart valve. There was motion in the lateral view even though the patient was dead. The round mass in the lung looks as though it might be due to malignancy.

A PHYSICIAN: Why is it not neurofibroma?

DR. HAMPTON: It is in the lung parenchyma.

DR. RICHARDSON: This is a postmortem film?

DR. HAMPTON: Yes. The heart shows, as you have predicted, the shape of one associated with aortic stenosis.

DR. MALLORY: There was one thing that struck me in reading over the record—the repeated comment about how dehydrated he was in spite of the fact that he was waterlogged. Is that an unusual combination in heart disease?

DR. RICHARDSON: I should think that might occur in any chronic edema.

DR. WILFRID J. COMEAU: Clinically this patient did not give the picture of heart failure. He was very weak and markedly dehydrated when he entered the hospital. Both Dr. Paul D. White and I believed there was little clinical evidence on physical examination that he had any significant heart failure, although there was no question about his having heart disease. The picture which he presented clinically was more that of malignancy and, as I have said, he was very ill and little could be done in the way of extensive study. We hoped that he might improve following the administration of fluids, but he never really did lose his dehydration. The edema was certainly no more than moderate at the most. Dr. Chester M. Jones and Dr. Alfred Kranes saw him, and we all believed that there was intrinsic disease of the liver as the cause of his illness and that his cardiac condition was really incidental.

DR. WILLIAM B. BREED: I do not mean to be hypercritical in asking Dr. Comeau a question, but I wonder what he means by "the picture of malignancy." That is a fairly broad statement, and I just want to know what he means by it.

DR. COMEAU: I mean the clinical picture that one associates with terminal malignancy—loss of weight, marked asthenia, emaciation and dehydration.

DR. BREED: But not referable to any particular part of the body?

DR. COMEAU: That is right.

Of course there is the tumblerful of blood which he vomited to be explained. His jaundice

was definite, and there was no history, as we went back, that indicated much in the way of cardiac symptoms. The dyspnea was questionable. Six months before his last entry he was able to walk three miles a day without discomfort. His history from the beginning pointed to the gastrointestinal tract and, as I have said, he did not give the picture of cardiac failure. He had no orthopnea and no dyspnea, and I might add that his lungs were clear and that it was not until the last few days that he developed signs suggesting either infarct or a pneumonic process at the right base. This was coincident with the terminal rise in temperature.

DR ALFRED KRANES: I saw him a few days before death. He was somewhat stuporous and could not co-operate very well, but I was impressed more than anything else by an apparent increase in the size of the liver, a point which the history does not bring out. When I went over him the liver edge was easily palpable in the midline down to the umbilicus. I believed that if there ever was a large liver this was one. It was tender. He would grunt every time you palpated that region. He had definite jaundice, and at the time there was no evidence of heart failure, and no venous distention. Although examination of the lungs was unsatisfactory, I could not detect anything. I thought, too, that he had intrinsic liver disease and that the heart disease was incidental, playing no part in the picture. Just what the nature of the liver disease was, I did not know. I thought obstructive jaundice could be ruled out and that perhaps he had some form of cirrhosis with superimposed malignancy, possibly a primary neoplasm of the liver. The spleen, however, was not palpable.

#### CLINICAL DIAGNOSES

Aortic stenosis  
Carcinoma of liver  
Bronchopneumonia

#### DR RICHARDSON'S DIAGNOSES

Calcereous aortic stenosis  
Congestive failure  
Chronic passive congestion of liver and kidneys  
Terminal bronchopneumonia

#### ANATOMICAL DIAGNOSES

Rheumatic heart disease  
Endocarditis, chronic rheumatic, mitral and aortic, with aortic stenosis  
Cardiac hypertrophy and dilatation  
Pulmonary infarction, right lower lobe  
Thrombosis, right popliteal vein  
Jaundice

Chronic pancreatitis  
Acute duodenal ulcer  
Chronic passive congestion of liver  
Thrombosis of periprostatic veins

#### PATHOLOGICAL DISCUSSION

DR MALLORY: I think it is quite possible that this is one of the types of cases it is easier to diagnose from the record than in life. Certainly Dr Richardson's predictions were all very closely fulfilled. The primary difficulty was heart disease. His heart weighed 615 gm., and it was considerably dilated. He did have aortic stenosis, but he also had a very marked involvement of the mitral valve. This was of a peculiar character. I can remember only one other case like it. All the leaflets of the mitral valve and the chordae tendineae were markedly thickened, but they were not shortened, so that the lesion did not seem to produce any deformity of the valve. Nevertheless, the auricle behind that valve was greatly dilated. The liver seems to have been another of those gymnastic ones we meet so often in these clinics; it had crawled up to the costal margin again by the time we saw it. It showed a very marked grade of chronic passive congestion, with extensive central necrosis but no cardiac cirrhosis. There was a considerable grade of bile stasis. The kidneys, I should say, were negative except for chronic passive congestion. The ball that you saw in the postmortem chest film at the right base was a massive pulmonary infarct that occupied about two thirds of the right lower lobe.

DR HAMPTON: That is the first round one I have seen.

DR MALLORY: Any patient with a sufficient degree of cardiac failure can develop jaundice. It is well known that the one thing that characteristically brings out jaundice—sometimes severe jaundice—in cardiac patients is to develop a pulmonary infarct. Dr Richardson was on the right track in saying that the one essential lack in the clinical work-up was a chest film, although I am not sure it would have helped him in his interpretation.

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DR MALLORY: We estimated about ten days.

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There was a small duodenal ulcer which appeared to be rather active. There was also a moderate grade of what I think one must call chronic pancreatitis. There were many small foci of fat necrosis scattered throughout the pancreas, and a slight chronic inflammatory infiltration. It did not seem to have destroyed a large amount of pancreas, and whether it was severe enough to have played a significant part in his clinical picture, I do not know. It may well have had bearing on the severe loss of weight.

## CASE 25082

### PRESENTATION OF CASE

*First Admission* A fifty-five-year-old Swedish woman was admitted complaining of intermittent epigastric pain of six months' duration.

The pain often started on the right side, spreading to the left, and at times covered the entire upper abdomen. It was usually not severe, never very sharp, but was sometimes severe enough to make her "writhe." It lasted several hours to half a day, occasionally woke her at night, and occurred on an average of every three days. During the previous few months anorexia and nausea were present. Two weeks before admission she vomited for the first time, the vomitus containing greenish, bitter material but no blood. She also had a moderate amount of belching.

For several years she had been constipated, took many cathartics and passed hard, black stools. She had not been jaundiced. During the previous year she had lost 30 pounds in weight. Her father had died of cancer of the liver, her mother of a tumor of the stomach.

Physical examination was negative except for a loud systolic murmur over the cardiac apex, a blood pressure of 175 systolic, 90 diastolic, and a palpable liver edge about 3 cm below the right costal margin.

X-ray films of the chest and abdomen were negative except for slight arteriosclerosis of the aorta. Two stool examinations were guaiac negative.

No definite findings developed and the patient was discharged on the twelfth hospital day with the diagnoses of hypertensive heart disease, mild congestive heart failure and anxiety neurosis.

*Second Admission* (seven months later) She had been much worse since discharge, complaining of a dull, aching distended feeling in the epigastrium. Soda gave some relief by causing gaseous eructation. Three months before entry she came to the Out Patient Department complaining that she had had chills and epigastric pain radiating to the back. Fatty foods aggravated the distress.

A Graham test showed no filling of the gall bladder.

On entry physical examination was essentially the same as that of the last admission. On the seventh hospital day a thickened adherent gall bladder was removed. A stone was impacted in the cystic duct, and two rather large stones were found in the fundus. She had an uneventful convalescence and was discharged on the twenty-fourth hospital day.

*Third Admission* (three years later) She entered for slight vaginal bleeding of five months' duration. There were no gastrointestinal complaints. Physical examination showed a slightly enlarged heart and a systolic murmur heard at the apex and aortic area. The blood pressure was 190 systolic, 98 diastolic. A uterine curettage showed adenocarcinoma. On the thirty-second hospital day radium was inserted. She was discharged six days later.

*Fourth Admission* (seven and a half years later) Four or five years before the fourth admission she noted the gradual onset of left upper-quadrant, nonradiating pain, which was of a dull "gripping" nature. Accompanying this was a feeling of general malaise. The pain was intermittent, not associated with meals, and did not cause nausea or vomiting. There was no change in bowel habits. No chills, fever or jaundice occurred. One year later a similar pain seemed to be superimposed in the midepigastrium. During the previous two years she had noticed slight morning nausea, but no vomiting. At that time she first became aware of epigastric distention. This had no relation to meals, coming on at most any time during the day. She had lost 5 pounds in weight since her previous admission. A gastrointestinal x-ray series taken in the Out Patient Department two months before admission showed a 3 cm, non-ulcerated, barium-coated defect lying within the lumen of the fundus of the stomach. The remainder of the examination was negative. Three weeks later examination was repeated and showed a round, non-ulcerated mass about 4 cm in diameter which was attached to the stomach wall by what appeared to be a 4-cm base. She had had no recurrence of vaginal bleeding or pelvic symptoms.

Physical examination showed a slightly obese female, weighing 139 pounds, in no distress. The left border of the heart was 3 cm outside the midclavicular line. An aortic systolic murmur was heard. The blood pressure was 195 systolic, 98 diastolic. Abdominal examination was negative.

The temperature was 98.6°F, the pulse 85, and the respirations 24.

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Preceding a gastroscopic examination 5 cc of cloudy gastric secretion was obtained which contained no free hydrochloric acid. The gastroscope revealed a normal antrum and pylorus. The color of the mucosa was normal except for a 4-mm erosion in the upper part of the body on the posterior wall. No polyp could be demonstrated but part of the field, especially along the lesser curvature, was obscured by mucus.

On the eighth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

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She returned to the hospital seven months later and a typical history of chronic cholecystitis was elicited. The removal of the gall bladder apparently resulted in a cure of her gastrointestinal complaints.

I judge the adenocarcinoma found on the third admission was in the fundus of the uterus. I know very little about surgery of the uterus, but suppose that hysterectomy would have been the proper procedure. Perhaps she refused operation. It is true that radium is sometimes used instead of operation, and it may be they believed, in view of hypertension and other conditions present, that operation was best avoided. Even though I do not approve of it, the treatment seems to have been very effective because there was apparently no recurrence of the trouble.

Seven and a half years later she gave a story of atypical epigastric complaints—a certain amount of distention, discomfort, and so forth. It is striking that if you take the x-ray examination out of this account of her fourth admission there is very little left. Such a story of mild digestive complaints might well have been due to so-called “nervous indigestion” or to gastritis. The laboratory findings are normal. Apparently the bone of contention is what was the nature of the lesion or defect in the stomach. I should very much like to see the films. Where is the 4-cm base?

DR. GEORGE W HOLMES I cannot demonstrate it, and apparently they did not succeed in demonstrating it on the film. It was probably determined from fluoroscopic examination. I think we can say the lesion is intrinsic and not in the wall of the stomach, because of the character of the margin of the shadow. If this were anything like a leiomyoma in the wall of the stomach it would not have this type of margin. The statement that it was not ulcerated should be taken with a grain of salt. We might not have been able to demonstrate an ulcer, but it seems fairly certain that there is an actual lesion, a pedunculated tumor growing into the stomach. There is nothing to indicate here whether it is benign or malignant. It is not a hair ball or any loose object in the stomach but a lesion attached to the wall of the stomach. The fact that they failed to see it at gastroscopic examination is what you would expect, one cannot see that portion of the stomach.

DR BRAILEY That is a great help. I was not sure from the report whether this thing had not moved around and I was not perfectly certain it was attached to the wall of the stomach. Dr Holmes assures us that it is so attached. It probably is a polypoid lesion of some sort.

DR HOLMES I am basing my statement on the record, not on what I see in the film.

DR BRAILEY You cannot tell from the film whether it was floating around?

DR HOLMES No, except that it is in an unusual position for a foreign body. I think that we can accept the statement as given by the man who examined the patient.

DR. BRAILEY It is still a bit ambiguous to me. I cannot pursue this differential diagnosis very far. I do not believe the lesion has anything to do with her previous admissions. If she had a cancerous lesion of any sort it is interesting that she had no anemia and had lost no appreciable amount of weight, although such good health might not be inconsistent with a cancer that had not ulcerated or become necrotic. Except that she was of cancer age, there is no very good evidence

of malignancy I am inclined to suppose that the lesion was benign, and I am not wholly convinced that she had anything wrong with her stomach. I do not believe we can absolutely exclude a hair ball or something of that sort. If the tumor is benign, it is an adenoma or a polyp and, as Dr. Holmes pointed out, would not be seen by gastroscopy. It was probably not the cause of her symptoms.

DR. PAUL D. WHITE I cannot understand why mild congestive heart failure was diagnosed on the first admission. I agree that it seems ridiculous in the absence of any story of dyspnea. You must have dyspnea first.

DR. TRACY B. MALLORY There is nothing more in the full record to explain that diagnosis.

DR. GRANTLEY W. TAYLOR Her symptoms in her final illness began within a year or two of the time she had carcinoma of the uterus treated by radium, and while metastases to the wall of the stomach are very unusual, we do occasionally see capricious metastases. The possibility that the lesion is metastatic seems to me to be worthy of consideration.

DR. BRAILEY Is it not fair to suppose that in seven and a half years it would have become an ulcerated mass?

DR. TAYLOR Yes, that is entirely reasonable.

DR. HOLMES If you could accept the x-ray report that this is a pedunculated lesion, could it be a metastasis?

DR. TAYLOR Probably not.

#### CLINICAL DIAGNOSIS

Tumor of stomach

#### DR. BRAILEY'S DIAGNOSIS

Benign gastric polyp or adenoma

#### ANATOMICAL DIAGNOSIS

Leiomyosarcoma of stomach

#### PATHOLOGICAL DISCUSSION

DR. MALLORY This patient was explored by Dr. Richard H. Sweet, who could feel with some difficulty through the anterior surface of the stomach a tumor of the posterior wall close to the cardiac orifice. He was forced to open the stomach in order to visualize it and then found that he was dealing with a circumscribed sessile tumor which was firm, with no ulceration of the mucosa

over it, and had all the gross appearances of a benign tumor. He was faced with a choice of doing either a very local excision or a practically total gastrectomy, and thought it was wiser to do the former. The specimen which reached the laboratory proved to be a spindle-cell tumor apparently of smooth-muscle origin and of a rather borderline malignancy. It contained a small number of mitotic figures and a rare tumor giant cell, and our eventual diagnosis was leiomyosarcoma. These tumors when they get a little bigger are more or less regularly accompanied by ulceration of the overlying mucosa, probably because of interference with the blood supply. The ulceration is apt to penetrate deeply into the tumor and then burrow laterally, giving a very characteristic picture, but I do not remember having seen such an ulceration in tumors as small as this.

DR. RICHARD SCHATZKI We have seen it in tumors even smaller. I remember one patient who had a small duodenal tumor with ulceration.

I am wondering if there can be any connection between the degree of malignancy and the stage at which ulceration occurs. Is not ulceration more likely in a malignant tumor than in a benign one?

DR. MALLORY I should think so. The probabilities of inadequate blood supply and necrosis are certainly greater in the former.

DR. SCHATZKI The tumor I spoke of was very malignant, and the patient died shortly after with extensive metastases.

DR. HOLMES Is it not unusual for that type of tumor to be sessile?

DR. MALLORY No. We have seen a number that were sessile. They can be either pedunculated or sessile. They can project either into the lumen of the stomach or externally into the abdominal cavity, thus causing no deformity whatever of the lumen of the stomach.

DR. EDWARD B. BENEDICT How many metastatic tumors of the stomach have you seen?

DR. MALLORY I cannot at the moment think of any.

DR. BENEDICT I never saw one. I wonder if anyone has.

DR. MALLORY I have seen metastases in other parts of the gastrointestinal tract.

DR. SCHATZKI Cancer of the breast has been reported to have metastasized to the stomach.

DR. MALLORY I see no reason why it should not occur, but it certainly is uncommon.

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DR HOLMES No, except that it is in an unusual position for a foreign body. I think that we can accept the statement as given by the man who examined the patient.

DR BRAILEY It is still a bit ambiguous to me. I cannot pursue this differential diagnosis very far. I do not believe the lesion has anything to do with her previous admissions. If she had a cancerous lesion of any sort it is interesting that she had no anemia and had lost no appreciable amount of weight, although such good health might not be inconsistent with a cancer that had not ulcerated or become necrotic. Except that she was of cancer age, there is no very good evidence

of malignancy I am inclined to suppose that the lesion was benign, and I am not wholly convinced that she had anything wrong with her stomach. I do not believe we can absolutely exclude a hair ball or something of that sort. If the tumor is benign, it is an adenoma or a polyp and, as Dr Holmes pointed out, would not be seen by gastroscopy. It was probably not the cause of her symptoms.

DR. PAUL D. WHITE: I cannot understand why mild congestive heart failure was diagnosed on the first admission. I agree that it seems ridiculous in the absence of any story of dyspnea. You must have dyspnea first.

DR. TRACY B. MALLORY: There is nothing more in the full record to explain that diagnosis.

DR. GRANTLEY W. TAYLOR: Her symptoms in her final illness began within a year or two of the time she had carcinoma of the uterus treated by radium, and while metastases to the wall of the stomach are very unusual, we do occasionally see capricious metastases. The possibility that the lesion is metastatic seems to me to be worthy of consideration.

DR. BRAILEY: Is it not fair to suppose that in seven and a half years it would have become an ulcerated mass?

DR. TAYLOR: Yes, that is entirely reasonable.

DR. HOLMES: If you could accept the x-ray report that this is a pedunculated lesion, could it be a metastasis?

DR. TAYLOR: Probably not.

#### CLINICAL DIAGNOSIS

Tumor of stomach

#### DR. BRAILEY'S DIAGNOSIS

Benign gastric polyp or adenoma

#### ANATOMICAL DIAGNOSIS

Leiomyosarcoma of stomach

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: This patient was explored by Dr. Richard H. Sweet, who could feel with some difficulty through the anterior surface of the stomach a tumor of the posterior wall close to the cardiac orifice. He was forced to open the stomach in order to visualize it and then found that he was dealing with a circumscribed sessile tumor which was firm, with no ulceration of the mucosa

over it, and had all the gross appearances of a benign tumor. He was faced with a choice of doing either a very local excision or a practically total gastrectomy, and thought it was wiser to do the former. The specimen which reached the laboratory proved to be a spindle-cell tumor apparently of smooth-muscle origin and of a rather borderline malignancy. It contained a small number of mitotic figures and a rare tumor giant cell, and our eventual diagnosis was leiomyosarcoma. These tumors when they get a little bigger are more or less regularly accompanied by ulceration of the overlying mucosa, probably because of interference with the blood supply. The ulceration is apt to penetrate deeply into the tumor and then burrow laterally, giving a very characteristic picture, but I do not remember having seen such an ulceration in tumors as small as this.

DR. RICHARD SCHATZKI: We have seen it in tumors even smaller. I remember one patient who had a small duodenal tumor with ulceration.

I am wondering if there can be any connection between the degree of malignancy and the stage at which ulceration occurs. Is not ulceration more likely in a malignant tumor than in a benign one?

DR. MALLORY: I should think so. The probabilities of inadequate blood supply and necrosis are certainly greater in the former.

DR. SCHATZKI: The tumor I spoke of was very malignant, and the patient died shortly after with extensive metastases.

DR. HOLMES: Is it not unusual for that type of tumor to be sessile?

DR. MALLORY: No. We have seen a number that were. They can be either pedunculated or sessile. They can project either into the lumen of the stomach or externally into the abdominal cavity, thus causing no deformity whatever of the lumen of the stomach.

DR. EDWARD B. BENEDICT: How many metastatic tumors of the stomach have you seen?

DR. MALLORY: I cannot at the moment think of any.

DR. BENEDICT: I never saw one. I wonder if anyone has.

DR. MALLORY: I have seen metastases in other parts of the gastrointestinal tract.

DR. SCHATZKI: Cancer of the breast has been reported to have metastasized to the stomach.

DR. MALLORY: I see no reason why it should not occur, but it certainly is uncommon.

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## ANNUAL REGISTRATION OF PHYSICIANS

AGAIN this year the Board of Registration in Medicine has introduced a bill providing for annual renewal of registration of physicians. The primary object seems to be to find out what physicians are practicing medicine each year in the Commonwealth and where they have their offices. Under the present system, a physician after registration may be lost so far as the Board is concerned. He is expected to notify the town clerk when he opens an office for practice but there is no way of finding out where he does practice if he fails to report. Having once reported, he may move from city to city without notifying the town clerk. It would seem to be a reasonable requirement that the public be enabled to find out through the Board of Registration in Medicine what licensed physicians are in practice and where they are located.

Why then has there been such vigorous opposition to the bill in the past, and why are some physicians still opposed to it? It is not possible to discuss all the reasons given, but an examination of the bill indicates that most of the objections are the product of fancy. For example, it has been claimed, if the bill becomes law, that the medical profession will be regimented, that the Board will be given inquisitorial powers so that the police will call on physicians for full information about their practice, that neglect to register will mean immediate suspension of the physician's license, that it will make possible the withholding of registration by the Board for reasons of personal pique.

There are two intelligible objections to the bill. The first one is to the taxing of physicians so that the State may employ its police power (in part) for detecting unlicensed physicians. In this connection it is pertinent to note that the Board of Registration in Medicine is created and acts under the police power of the State. But, if the bill would seriously reduce the number of unlicensed practitioners, most physicians would not object, and there are few well-informed physicians who object to the tax, whether it be one or two or three dollars. There is the second objection, namely, that if the money once gets into the state treasury, they see little chance of getting it out for the work of the Board, and they fear it will be diverted for some other purpose. "Eternal vigilance is the price of liberty" and under this democratic form of government of ours a remedy is provided. When the budget of the Board of Registration in Medicine is before the Committee on Ways and Means, these physicians who are fearful of the division of the additional revenue should appear in support of the Board's requests. It means effort and is time-consuming. However, if no one ever makes representations, is it unfair to assume that no one really cares?

Annual registration of physicians is in force in a number of states and has been found to be very helpful. In Massachusetts it is required for a number of other boards. What is so peculiar about medicine here that the public is not justly entitled



to know each year who is registered as qualified to engage in the practice of this profession?

The recent vote by the Council of the Massachusetts Medical Society to place itself on record as favoring the bill is to be interpreted as a decision by a gradually increasing number of physicians that in spite of all that has been said against annual registration and in spite of some slight cost and very slight inconvenience to themselves in filing the information required, the carrying out of the provisions of the bill will redound to the benefit of the public. This is, after all, the calculated purpose of the measure, and it is in accordance with the age-long efforts and the enduring spirit of the medical profession

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### SCHOOLS FOR TECHNICIANS

THE marked development of the laboratory side of medicine has created a demand for workers who supplement the physician in his investigations in this field. These so-called technicians, some of whom have a very high degree of special knowledge and skill, carry on many of the procedures which lead to the establishment of certain facts. These facts are not the diagnosis but they are a part of the evidence which the physician reviews and interprets in making his diagnosis. Under former conditions each laboratory might train its own workers but the present demand has so far outrun the supply that special schools for technicians have been established.

Recent newspaper reports indicate that such a school for technicians was opened in Boston under auspices which were at least unfavorable. Efforts had been made to secure reputable and competent physicians as teachers, but soon the school passed into the hands of a financing corporation and the creditors removed unpaid-for equipment and supplies. Many of the students are reported to have paid full tuition for one year in advance, and so the Attorney General has a problem in attempting to secure some share of justice for the students who claim they had been promised jobs on completing the course.

The incident is instructive and in the newspapers the term "racket" has been employed as characterizing the conduct of vocational schools, of which some other types are under investigation. In passing, it may be noted that "rackets" in medical education have been heard of before today. There is involved here a very comprehensive and complicated problem which goes beyond the question of schools for laboratory workers or milliners, and includes other types of education. Why not all types? The essence of the problem can be stated briefly: the student should receive a fair and just return for his money and his effort.

The offhand answer which finds many supporters is that no educational institution, even if merely vocational, should be established except with the approval of the government. But the requiring of unqualified governmental approval is so incompatible with the freedom of thought and speech which we in this country regard as fundamental to just action, that the other extreme view, favoring no governmental approval, finds extensive support. There is a middle ground which is reasonable. It is that the owners or promoters of the educational institution should show in some concrete way their capacity to meet the financial responsibilities which the conduct of the institution requires. It is possible to obtain in Massachusetts a charter for a medical school, if no degree-conferring power is sought, without any evidence of its owning any property, and even the charter of a degree-conferring university, without evidence that the university possesses any endowment, that is, income-producing property of any sort.

The flagrant abuse in the case noted in the press may be remedied by some patchwork scheme, but what is needed is a new policy on the part of the State to prevent abuses in the future.

The conduct of schools for technicians for clinical laboratories and the conduct of such laboratories without the supervision by qualified physicians present other problems which the medical profession must sometime face.

## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## POSTPARTUM HEMORRHAGE

Mrs. H. M., a twenty-six-year-old primipara, thirty weeks pregnant, entered the hospital about midnight September 11, 1938, with ruptured membranes but not in labor.

The family and past histories were noncontributory. She had had no serious illnesses and no operations. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted five days without pain. Her last period was February 12, making her due for confinement November 19.

The patient was first seen on June 10. Physical examination showed a well-developed and nourished woman. The lungs were clear. The heart was not enlarged, the sounds regular and of good quality, there were no murmurs. The blood pressure was 114 systolic, 70 diastolic. The fundus was just above the umbilicus, and the fetal heart could not be made out. Vaginal examination showed the cervix soft and closed. On September 2 an x-ray examination confirmed the diagnosis of twins. One vertex was seen in the pelvis, and the other in the left upper quadrant. On September 10, the day before entry, her blood pressure was 115 systolic, 78 diastolic. The fundus was two fingerbreadths below the xiphoid, and a fetal heart was heard. One vertex was below the pelvic brim. Vaginal examination showed the cervix soft but fairly long. There was no internal os.

Labor began about 7 p.m., September 12, its progress was very slow. At 10:30 a.m., September 13, vaginal examination showed that the cervix was dilated so as to admit four fingers, with the first head below the spines of the ischia. The cervix was gently dilated manually, and labor allowed to continue. By 12:30 p.m. she was fully dilated except for the anterior lip. The position was ORA, a forceps was applied, and the first twin was easily lifted over the perineum after a median episiotomy. This child was a boy weighing 3 pounds, 6 ounces. The second sac was then felt intact above the pelvic brim, with the vertex presenting. The sac was ruptured, both feet were grasped, and the child was extracted by the breech after internal

podalic version. A forceps was applied to the after-coming head. This child, also a boy, weighed 3 pounds, 13 ounces. The episiotomy was repaired in routine fashion. The placenta or placentas did not separate. As there was little or no bleeding and the patient seemed in good condition, it was decided to wait. However, at the end of an hour and a half a slight amount of bleeding indicated partial separation. The patient's pulse rate began to rise. Two hours and a quarter after delivery, bleeding became more profuse and the pulse rate jumped to 160. Still no placenta could be expressed, even after 0.25 cc of pituitary extract had been given intravenously. There was obviously no point in waiting longer. The patient and husband were grouped for possible transfusion and were found to be compatible. Under nitrous oxide, oxygen and ether anesthesia, the vagina and uterus were explored. Part of a placenta was detached and protruded through the cervix, but at least two thirds of the two placentas were still adherent over the anterior wall and fundus. The latter portion separated readily when a hand was introduced between the placentas and the uterus, and the two fused placentas, complete with membranes, were extracted. The uterus shut down well, there was no further bleeding. Five per cent glucose solution was given intravenously. The patient's pulse came down to 120, and her condition seemed good. The total loss of blood was estimated at about 500 cc, and there seemed to be no indication for immediate transfusion.

On September 14, the hemoglobin was 56 per cent (Sahli), the red-cell count 3,440,000, and the white-cell count 36,600. She ran a febrile course for about a week and showed a marked anemia. Cultures from both lochia and blood showed no streptococci. On September 20, the hemoglobin was 53 per cent, and the red-cell count 2,600,000. Because of this finding she was transfused with 500 cc of her husband's blood on September 21. Following the transfusion, the patient's temperature rapidly came down to normal, and on September 23 the hemoglobin was 78 per cent, and the red-cell count 3,800,000. She was discharged on the seventeenth day after delivery.

*Comment.* This hemorrhage was due to an adherent placenta which had become partially separated. Its occurrence in a case of twins was purely accidental.

When there is little or no bleeding, it is always safe to wait quite some time after the birth of the baby for the placenta to separate. In this case there was practically no bleeding for over an hour, and then hemorrhage began and continued so that the pulse rate rose to 160. This meant that the

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

placenta had partially separated and ruled out further delay in entering the uterus. The entering of a uterus after delivery must be accompanied by perfect asepsis. Infection too often occurs even after the most careful aseptic precautions, particularly following an adherent placenta. In such a case, the uterine sinuses are intimately traumatized and infection is liable to occur. That these fused placentas could be obtained in toto means that the adherence was slight.

Transfusion at the time was not essential. A donor was at hand, but the uterus behaved well and the pulse rate came down immediately. The subsequent transfusion because of the anemia accompanying the sepsis was probably a helpful procedure, but such transfusions must be done only after the most careful checkup. Transfusion is a very valuable method of therapy, but can result disastrously, if the proper precautions are not taken. For such an accident to occur following a transfusion that is not given for the immediate loss of blood is unpardonable.

#### LEGISLATIVE NOTES

Below is listed the progress in the Legislature of some of the bills in which the Massachusetts Medical Society is interested.

#### FAVOR

*S 258* Bill relative to the meaning of the terms rendering medical service, practice of medicine and holding oneself out as a practitioner of medicine and to exempt dentists, optometrists and chiropodists in certain cases from penalties provided for the unlawful practice of medicine. The bill was proposed by the Board of Registration in Medicine. It is favored by the Society with the addition of the following sentence at the end of Section 5A: Such treatment shall include examination of any secretion, excretion or discharge of the living body.

This bill was heard before the Committee on Public Health on February 9, but no report has yet been made.

*H 59* Identical with *S 258*.

This bill was heard at the same time as *S 258* but no report has yet been made.

*H 60* Bill requiring annual licensing of qualified physicians. This bill was proposed by the Board of Registration in Medicine, and gives the necessary powers to the Board. The Council of the Massachusetts Medical Society voted to favor it by a vote of 114 to 34.

It was heard by the Committee on Public Health on February 9, but no report has yet been made.

*H 61* Bill relative to the qualification for membership on the Board of Registration in Medicine. This bill allows any number of members to be members of one medical society.

The bill has been passed to be engrossed.

*H 72* Bill providing for the care of certain infants prematurely born. It was proposed by the Department of Public Health, and corrects defects in the previous bill.

It has been passed by the House and referred back to the

Committee on Ways and Means, where it was heard February 21.

*H 73* Bill providing for supplementary reporting of congenital deformities and birth injuries in infants. The bill was proposed by the Department of Public Health and requires that supplementary reports be sent to this department.

This bill was heard before the Committee on Public Health on January 26 but no report has yet been made.

*H 74* Bill requiring the clerk or registrar in each city or town to give to persons who file notice of intention of marriage suitable information concerning gonorrhea and syphilis. The bill was proposed by the Department of Public Health and it contains no compulsion.

This bill will be heard by the Committee on Public Health, but no date has yet been assigned.

*H 75* Bill making various changes in the laws relating to foods and drugs. The bill was proposed by the Department of Public Health in order to bring the state law into line with the new federal act.

It will be heard by the Committee on Public Health, but no date has yet been assigned.

*H 670* Bill providing for the issuance of certificates of approval of bacteriological laboratories by the Department of Public Health. The bill was proposed by the Massachusetts Public Health Association and is similar to the one favored by the Massachusetts Medical Society last year.

No hearing date has been set by the Committee on Public Health, before which it will be heard.

*H 852* Bill requiring licensing of hospitals, convalescent homes and nursing homes. This bill was proposed by the Massachusetts Central Health Council and provides for the Department of Public Health to set up certain standards of health and enforce them.

It was heard by the Committee on Public Health on February 2, but no report has yet been made.

*H 1407* Bill prohibiting aliens from practicing medicine. This bill was proposed by Rep. Vaughan and is poorly written. It provides that no license be granted to an alien until his first papers have been filed, but allows certain very broad exceptions.

This bill will eventually be heard by the Committee on Public Health.

#### OPPOSE

*H 287* Bill providing for a marriage protection law by requiring a physician's examination and certificate before issuance of marriage licenses. This bill was proposed by Rep. Cutler and it needs major revision before being satisfactory.

It will be heard before the Committee on Public Health at some future date.

*H 551* Bill requiring that notices of intention of marriage shall be accompanied by a physician's certificate that neither party is infected with syphilis. This bill was proposed by Dr. William Frankman and also needs major revision before being satisfactory.

It has been assigned to the Committee on Public Health, and no date has been set for a hearing.

*H 758* Bill providing authority to the Board of Registration of Nurses to limit further training of nurses of all classes and attendants under certain conditions. The bill was proposed by Miss Josephine E. Thurlow, but is against public policy.

It was heard by the Committee on Public Health on February 2, and will be heard again on March 7

*H 759* Bill providing for training and licensing of first-class bedside nurses This bill was proposed by Miss Josephine E Thurlow, but is against public policy

It was heard by the Committee on Public Health on February 2, and will be heard again on March 7

*H 858* Bill regulating the practice of nursing This bill was proposed by the Massachusetts State Nurses Association, and while it is better than last year's bill, some of last year's defects are still present.

It was heard by the Committee on Public Health on February 2, but no report has yet been made.

*H 985* Bill requiring doctors of medicine and doctors of osteopathy on the Board of Registration in Medicine. This bill was proposed by the Massachusetts Osteopathic Association and would put two osteopathic physicians on the Board.

It was heard before the Committee on Public Health on February 9, but no report has yet been made

*H 986* Bill providing for a doctor of medicine and a doctor of osteopathy on the Approving Authority and the status of approvals by the American Medical Association and the American Osteopathic Association This bill was proposed by the American Osteopathic Association, it weakens the Approving Authority

This bill was heard February 9 by the Committee on Public Health, but it has not yet made a report.

*H 1401* Bill providing that certificates of vaccination or non-vaccination shall no longer be required as a prerequisite to the attendance of any child in public schools This is a typical anti vaccination bill

It will be heard before the Committee on Public Health but no date has yet been assigned for the hearing

*H 1898* Bill providing for the establishment and administration of a system of health insurance. This bill was proposed by the State Industrial Council of the Congress of Industrial Organization (CIO) and means complete state insurance with a 4½ per cent payroll tax It represents real regimentation of physicians

It will eventually be heard by the Committee on State Administration

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning February 27

##### BARNSTABLE

Sunday, March 5, at 4 00 p m., at the Cape Cod Hospital, Hyannis Subject—Bleeding in the Third Trimester of Pregnancy Instructor Meinolf V Kappius Donald E Higgins, *Chairman*

##### BRISTOL NORTH

Thursday, March 2, at 4 00 p m., at the Morton Hospital, Taunton Subject—Operative Obstetrics Instructor Roy J Heffernan Lester E Butler, *Chairman*

##### BRISTOL SOUTH (Fall River Section)

Tuesday, February 28, at 4 00 p m., at the Union Hospital, Fall River Subject—Whooping Cough The present status of vaccine therapy both as pro-

phylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications Instructor R Cannon Eley Howard P Sawyer, *Chairman*

##### HAMPDEN

Thursday, March 2, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—Anemia Modern methods in diagnosis and treatment of blood dyscrasias Instructor Chester S Keefer George L Schadt, *Chairman*

##### MIDDLESEX EAST

Tuesday, February 28, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Bright's Disease and Hypertension Evaluation of new therapy, diagnosis Instructor Laurence B Ellis Walter H Flanders, *Chairman*

##### MIDDLESEX NORTH

Thursday, March 2, at 4 30 p m., at St. John's Hospital, Lowell Subject—Heart Disease The treatment of 'heart attacks' or "cardiovascular emergencies" Instructor Howard B Sprague William S Lawler, *Chairman*

#### DEATHS

**COREY**—FREDERICK H COREY, M.D., of 439 Union Street, Rockland, died February 18 He was in his sixty second year

Born in Charlestown he received his degree in 1904 from Tufts College Medical School Dr Corey was a fellow of the American Medical Association and of the Massachusetts Medical Society

**HARTNETT**—EDWARD D HARTNETT, M.D., of 62 Prescott Street, East Boston, died February 14 He was in his sixty-sixth year

Born in East Boston he received his degree from the Harvard Medical School in 1898 and entered practice the same year Dr Hartnett was a member of the Massachusetts Medical Society and the American Medical Association

Dr Hartnett was unmarried and a brother and two sisters survive him

#### MISCELLANY

##### MEDICAL MOTION PICTURES AVAILABLE FOR LOAN

Motion pictures on various scientific subjects of medical interest are available on a loan basis from the American Medical Association

Requests for films should be instituted as far in advance as possible, so that the proper reservations can be made. The exact shipping addresses and dates should be given at the time of the request, also the type of apparatus in which the film is to be run. Responsibility for the projection and care of the film must be borne by the individual or organization which is borrowing it. The American Medical Association does not have projectors available for loan

The only expense usually incurred is that of transportation both ways. However, careless handling resulting in serious damage may be charged to the borrower

A brief description of each film is given in the following list. Inquiries should be addressed to Dr. Thomas G. Hull, 535 North Dearborn Street, Chicago, Illinois

*Syphilis A motion picture clinic* Sound. 35 mm and 16 mm. Running time, about 1½ hours

The diagnosis and treatment of syphilis presented by national authorities.

*Cancer (Canti cancer film)* Silent. 35 mm Running time, about 45 minutes

A film demonstrating the proliferation of cell tissue and the formation of cancers.

*Blood Circulation (Harvey blood film)* Silent. 35 mm Running time, about 45 minutes.

An attempt has been made to reproduce the dissections and experiments performed and described by Harvey himself, and here explained in the main by extracts from Robert Willis's translation of Harvey's book.

*Blood Transfusion* Silent. 16 mm. Running time, about 45 minutes.

Three methods of blood transfusion, illustrated in detail

*Comparative Physiology of Labor* Silent. 16 mm Running time, about 1 hour

Demonstration of normal labor in the human being, the horse, the cow, the sheep, the dog, the pig and rabbit.

*Effects of Heat and Cold on the Circulation of the Blood* Silent. 16 mm. Running time, 12 minutes

Demonstration of the effect of heat and cold on circulation, as seen through a glass chamber installed in a rabbit's ear

*Effects of Massage on Circulation of Blood* Silent. 16 mm. Running time, 8 minutes.

Demonstration of the effect of massage on circulation, as seen through a glass chamber installed in a rabbit's ear

*Contraction of Arteries and Arteriovenous Anastomoses* Silent. 16 mm. Running time, 10 minutes.

This film visualizes the contraction of arteries and arteriovenous anastomoses as seen through a glass chamber installed in a rabbit's ear

*Therapeutic Exercises for the Shoulder Joint Following Dislocation* Silent. 16 mm. Running time, 10 minutes

Demonstration of static, passive, active and resistive exercises for the shoulder joint, using simple apparatus.

*Treatment of Compression Fracture of the First Lumbar Vertebra* Silent. 16 mm. Running time, about 12 minutes

This film shows physical therapy procedures to be administered to a fracture of the first lumbar vertebra during a patient's confinement in bed and immediately following

*Aids in Muscle Training* Silent. 16 mm Running time, about 12 minutes.

Demonstration of sling suspension exercises for the upper and lower extremities, graded exercises on a powdered board for the lower extremities, and three kinds of walkers for re-education exercises

*Underwater Therapy* Silent. 16 mm Running time, about 16 minutes

Presentation of the therapeutic use of large and small exercise pools, Hubbard tanks and homemade tanks, and demonstration of types of exercises given in cases such as those with infantile paralysis and cerebral palsy and following operation for congenital dislocation of the hip

*Occupational Therapy* Silent. 16 mm. Running time, 12 minutes.

This film demonstrates occupations that may be prescribed by physicians to motivate and control the desired physical or mental activity of the patient and assist in his adjustment to long hospitalization. A section on cerebral palsy is included, picturing indirect muscle training through prescribed activity and stressing the importance of early treatment to prevent growth of faulty habit patterns.

*Massage* Silent. 16 mm. Running time, 4 minutes.

Demonstration of the technic of massage, describing the various movements and showing why they are performed in a given way

#### ART TELLS HISTORY OF AMERICAN MEDICINE

Beaumont and St. Martin is the first of six large paintings in oil memorializing Pioneers of American Medicine which artist Dean Cornwell will complete in the next few years. Others in the series are Oliver Wendell Holmes, Ephraim McDowell, Crawford W. Long, William T. G. Morton, Major Walter Reed and one



'Beaumont and St. Martin'

woman, Dorothea Lynde Dix, who, while not a physician, stimulated physicians to study insanity and feeble-mindedness

Arrangements to supply physicians with free, full-color reproductions of 'Beaumont and St. Martin', without advertising and suitable for framing, have been made with the owners, John Wyeth & Brother, 1118 Washington Street, Philadelphia.

#### NOTE

The following appointments to the teaching staff at the Harvard Medical School were recently announced

Francis F. Hart, of Ambler, Pennsylvania, as resident physician to the Collis P. Huntington Memorial Hospital and research fellow in medicine, M.D. University of

Pennsylvania '36, John Pifers, of Detroit, Michigan, as assistant in pediatrics, MD University of Toronto '34

The annual Theobald Smith Memorial Lecture of the New York Society of Tropical Medicine was given on January 20 at Cornell University Medical College, New York City, by Dr Richard P Strong, professor of tropical medicine emeritus, Harvard Medical School His topic was 'Malarial Diseases in the Western Hemisphere.'

will benefit by conservative treatment until a comparatively safe cholecystectomy can be performed

D C PATTERSON, M.D

881 Lafayette Street,  
Bridgeport, Connecticut.

## BOSTON DOCTORS SYMPHONY ORCHESTRA

It is gratifying to announce that a doctors symphony orchestra is being formed under the direction of a famous international conductor, Nicolas Slonimsky It will not only be a musical treat but a privilege to play under a man who is also well known as a composer, critic, essayist and authority on modern music and musicians

Music as a hobby is so widespread among doctors—the New York Doctors' Symphony Orchestra has over a hundred members—that an organization of this sort should be a source of pleasure as well as a pride to professional groups

All physicians, dentists and medical and dental students who are interested in joining should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430) Meetings will be held at Hampton Court Hotel, 1223 Beacon Street, Brookline, every Thursday evening at 7 30, starting March 9

H. L. CABITT, M.D.,  
JULIUS LOMAN, M.D.,  
H. W. PARKER, M.D

## CORRESPONDENCE

### OPERATIONS FOR ACUTE GALL-BLADDER DISEASE

*To the Editor* There have been not a few papers written, and considerable discussion, in the past few years regarding the respective advantages of immediate and delayed operations in acute gall bladder disease The use of this term immediate by some authorities has, I think, been confusing and does not express their real intent It is to be noted that the authorities advising an immediate operation also state that the patient should have proper preoperative preparation and that twenty four to forty-eight hours can be well spent in such a preparation This takes the operation out of the immediate class, for most of us understand immediate operation to mean an operation as soon as possible, for example in a true emergency or in the usual case of acute appendicitis

A very small number of cases of gall bladder disease can be classed as emergencies requiring immediate operation Cases of perforation of the gall bladder and fulminating cases of empyema certainly come under such a classification, but to urge immediate operation for acute cholecystitis in general will lead to much harm Teachers of surgery who lend prestige and support to a policy of immediate operation in all cases provide authority for rash surgeons, inexperienced operators and uninformed practitioners

To liken acute cholecystitis to acute appendicitis is not reasonable, for it is but seldom that the two conditions progress in a similar manner There is no question about the benefits of surgery in acute appendicitis, but there are many well informed men who believe that the persistence of symptoms in such a large percentage of patients who have been operated on for cholecystitis brings up a justifiable doubt as to its value In view of this fact, and when it is further shown by a carefully studied series that 37 per cent of the cases of acute cholecystitis subside without intervention, the foundation for advising immediate operation in all cases is not any too firm furthermore, most surgeons favor cholecystectomy over cholecystostomy, and the former by a standard technic or any of the various modifications is out of the question in many of these cases

There is a possibility that some men misled by the use of the term immediate by teachers of surgery may feel justified in rushing in on cases of acute cholecystitis that would be much better off if the patient were treated otherwise for a day or two There might also be a change in diagnosis in some cases, by the light of another day The term "early" operation would be more applicable to the procedure in discussion and would no doubt receive the approval of many surgeons who are not willing to subscribe to the dictum of immediate.

Cases of acute cholecystitis should be studied individually Some will require immediate operation, some will be better for a few hours' or days preparation, and some

## REPORTS OF MEETINGS

### HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society was held on November 8, 1938

Dr Charles Stone presented the medical case. A thirty four year-old, single American factory worker was admitted with a story of seven or eight convulsive attacks in the last nine years, without aura, cry, biting of the tongue or loss of sphincter control Five years previous to admission there was a snap in the back of the head, blurred vision, diplopia, nausea, vomiting and inability to move the head, coming on suddenly Lumbar puncture showed grossly bloody fluid She improved after two months in bed, during which time she suffered from dizzy headaches, vomiting, impairment of memory, retention of urine and constipation Since that time there had been frequent headaches, some relieved only by lumbar puncture Two months previously she had had another similar attack, relieved by rest She had had frequent nosebleeds in her childhood Physical examination revealed a well-developed girl, with fundal arteries slightly increased in tortuosity No angiomas were seen in the fundi or in the nasal mucosa The lungs were clear There was a blowing systolic murmur at the apex of the heart The abdomen was negative, and the reflexes physiological The blood pressure was 140 systolic, 100 diastolic, and subsequently fell to 128 systolic, 78 diastolic The visual fields and caloric tests were normal The urine and stool examinations were normal The blood showed a red-cell count of 4,680,000 with 96 per cent hemoglobin, and a white-cell count of 8200 with 50 per cent polymorphonuclears The smear was normal The blood Wassermann and Hinton tests were negative Spinal fluid examination showed a clear colorless fluid with an initial pressure of 180 mm of water, the Pandy and ammonium sulfate tests were negative there were 15 red blood cells per cubic millimeter, undoubt

edly traumatic. The total protein was 30 mg per cent, and the gold sol curve flat. The spinal fluid Wassermann test was negative. Electroencephalograms, done subsequent to discharge, were reported as showing multiple foci of cortical disorder, worse in the temporal motor and occipital leads, worse on right than on left and most clearly abnormal in right temporal area. The absence of a single, clear, constant focus was said to be against brain tumor, abscess or fresh hemorrhage. Diagnosis spontaneous subarachnoid hemorrhage (? congenital aneurysm, ? angiomas, ? hypertension)

Dr James B Campbell presented the surgical case. A fifty-three year-old woman had suffered from frequent headaches for the past twenty years. Five months before entry she experienced an attack of vertigo, nausea and emesis, and fell to the left. Since this attack she had been unsteady on her feet. Five days before entry she experienced a recurrent attack similar to the one previously noted, and had had headaches in the right frontal region since that time. There was staggering gait, with a tendency to fall to the left, astereognosis, adiodochokinesis, nystagmus, choked disks bilaterally, and a slightly stiff neck. The visual fields were grossly normal. The blood pressure was 196 systolic, 140 diastolic. Electroencephalography was performed. Ventriculography showed a clear fluid with a low protein content (2 mg per cent) and a few red blood cells. There was dilatation of the lateral ventricles, and the third ventricle was seen to be widened in the posteroanterior skull plate.

Dr Hallowell Davis discussed the electroencephalographic tests which he had performed on the patient. There was considerable abnormality of the brain waves in practically all portions of the cerebrum, a finding consistent with generalized increase in intracranial pressure. If there is generalized increase in pressure there is little chance of localizing brain lesions by electroencephalography. Dr Ayer stated that between 30 and 40 per cent of cases with brain tumors show no increase in intracranial pressure. In these cases electroencephalography should be of great aid in localization of the lesion. In cases in which the pressure is increased, an encephalography is necessary. Dr James Poppen remarked that the signs, symptoms and x-ray evidence in this case pointed to a lesion in the cerebellum.

Dr Tracy J Putnam talked on 'Recent Developments in the Treatment of Neurological Diseases: Epilepsy, hydrocephalus, athetosis and paralysis agitans'. He first discussed epilepsy, pointing out the tremendous cost in money and human suffering caused by the 500,000 cases of epilepsy existent in the United States. The number of persons suffering from this disease is approximately equal to the number of cases of tuberculosis or of diabetes in the United States. Perhaps the greatest advance in the treatment of epilepsy until recent days was made in 1912 when the use of phenobarbital to control the disease was introduced. Attempts to resect the cortex and prevent seizures by other surgical measures have not been very successful, and medical therapy is still the most useful means of control.

He mentioned how he and Dr Houston Merritt had attempted to develop a compound which would be more successful than phenobarbital in controlling epilepsy. They found that abnormalities in the electroencephalograms of cats could be produced by passing electric currents through their craniums, and that these abnormalities were very similar to those observed in human encephalograms taken during attacks of epilepsy. They then found that convulsive seizures and typical electroencephalograms were produced in individual animals by a fairly constant amount of current. The threshold at which seizures were pro-

duced was constant enough to be used as a standard to test the effect of various substances in preventing or decreasing convulsions. Different drugs were administered to these animals in an attempt to raise the threshold at which seizures occurred. Phenobarbital was the only member of the barbiturate group which produced the desired effect. They therefore believed that the phenyl group was responsible for the depressant effect rather than the barbiturate group. One hundred phenyl derivatives were selected for trial, and of these diphenyl hydantoin was found to be the most satisfactory. This drug was then administered to patients with epilepsy with the result that 60 per cent were relieved of their symptoms. Work is still being carried on in an attempt to find an even more potent compound.

The attempts at treatment of internal hydrocephalus by surgical means were next described. Dr Putnam developed the bipolar glass ventriculoscope which enables him to cauterize the choroid plexus without causing injury to the basal ganglia. Following the last ten such operations there has been only one death. There are two types of infants with internal hydrocephalus. The first and commonest type is found in patients with multiple developmental defects, who are usually imbeciles. Operative therapy in such cases is hopeless and is contraindicated. The minority of cases show no abnormality other than an increased intraventricular pressure, and in these, operative therapy can be expected to bring relief. Dr Putnam has several such cases which have survived four years after the operation and are developing normally.

Athetosis is a disease following birth injury in which the muscles of one or more extremities or the neck are the seat of constant involuntary movements. These involuntary movements are caused by an irregular innervation of all the muscle groups of the extremity simultaneously. It was believed that the impulses causing these movements traveled down the extrapyramidal tracts, and several cases were subjected to section of the anterolateral tracts with marked improvement of symptoms.

Paralysis agitans is an alternating tremor caused by the alternate discharge of nerve impulses from cells supplying the flexor and extensor groups of muscles at a slow rate of five to eight impulses per second. Very little energy is expended by such tremors. In the belief that the impulses causing such tremors were carried down the extrapyramidal tracts, as was the case in athetosis, section of these tracts was performed. There was no change in the tremor. It was then suspected that the impulses were mediated by the pyramidal tracts, and these tracts were sectioned in two cases with return of function. There was subsequent recurrence of tremor in one of the cases, and a second operation was performed with a wider incision in the spinal cord. Following this operation there was abolition of the tremor and a partial restoration of function. Motion pictures were shown which demonstrated the great relief and the restoration of partial function in these cases.

## NOTICES

### FAULKNER HOSPITAL CLINICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, March 2, at 5 00 p m.

There will be a discussion of cases by Dr James M Faulkner and Dr John W Spellman

# BOSTON DOCTORS SYMPHONY ORCHESTRA



*Nicolas Slonimsky*

The newly organized Boston Doctors Symphony Orchestra, conducted by Nicolas Slonimsky, will start rehearsing on March 9. Rehearsals will be held every Thursday evening at 7:30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

## CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Haverhill	March 1	Arthur T. Legg
Lowell	March 3	Albert H. Brewster
Salem	March 6	Harold C. Bean
Brockton	March 9	George W. Van Gorder
Gardner	March 14	Mark H. Rogers
Springfield	March 15	Garry deN. Hough, Jr.
Worcester	March 17	John W. O'Meara
Pittsfield	March 20	Francis A. Slowick
Fall River	March 27	Eugene A. McCarthy
Hyannis	March 28	Paul L. Norton

## JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston  
Auditorium, 9-10 a. m.

### MEDICAL CONFERENCE PROGRAM

- Wednesday, March 1—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Thursday, March 2—Some Aspects of the Social Setting of Medical Practice. Dr. Talcott Parsons  
 Friday, March 3—Title to be announced. Dr. E. D. Churchill  
 Saturday, March 4—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Tuesday, March 7—Diagnosis and Treatment of Certain Bone Tumors. Dr. J. D. Adams  
 Wednesday, March 8—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Thursday, March 9—Laboratory Aids in the Detection of Gonococcus Infection. Dr. W. A. Hinton.  
 Friday, March 10—Functional Disturbances of the Gastrointestinal Tract. Dr. J. H. Means  
 Saturday, March 11—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Tuesday, March 14—Compression of Cancellous Bone, Manifestations in the head and neck of the femur, treatment by drill channels. Dr. Eugene Bozsán  
 Wednesday, March 15—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Thursday, March 16—Syphilitic Optic Atrophy (with lantern slides). Dr. S. H. Epstein.  
 Friday, March 17—Treatment of Diseases of the Pericardium. Dr. C. S. Burwell.  
 Saturday, March 18—Hospital Case Presentation. Dr. S. J. Thannhauser

- Tuesday, March 21—Clinicopathological Conference. Dr. Harold Wood  
 Wednesday, March 22—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Thursday, March 23—Certain Aspects of the Toxemias of Pregnancy. Dr. Lewis Dexter  
 Friday, March 24—Title to be announced. Dr. H. H. Merritt  
 Saturday, March 25—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Tuesday, March 28—X-ray Demonstration. Dr. Alice Ettinger  
 Wednesday, March 29—Hospital Case Presentation. Dr. S. J. Thannhauser  
 Thursday, March 30—Recent Concepts in the Etiology of Migraine. Dr. Arnold Zetlin.  
 Friday, March 31—Clinical Studies and Biochemistry of Virulism. Dr. H. B. Friedgood.

## TUFTS MEDICAL ALUMNI LECTURE

The annual alumni lecture will be given at Tufts College Medical School on Thursday, March 2, at 4:00 p. m. Dr. Frank Ober, Tufts College Medical School '05, will speak on "In Medicine, Your Invested Capital Is Your Brain. How to you propose to increase your investment?"

Physicians and medical students are cordially invited to attend.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, February 28, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance), at 8:15 p. m.

### PROGRAM

Presentation of cases  
 Further Experiences with Cyanate Therapy in Hypertension. Dr. Roger W. Robinson and Dr. James P. O'Hare.

Medical students and physicians are cordially invited to attend.

ROBERT ZOLLINGER, M.D., Secretary

## WORCESTER DISTRICT MEDICAL SOCIETY

The next meeting of the Worcester District Medical Society will be held at the Worcester Memorial Hospital, on Wednesday, March 8.

### PROGRAM

Micro-anatomic Changes in Shock. Dr. James S. Beck.  
 Peripheral Vascular Disease. Dr. George R. Dunlop.  
 Experiences with the Thiocyanate Treatment of Hypertension. Dr. Roger W. Robinson  
 GEORGE C. TULLY, M.D., Secretary

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 p. m. on Thursday, March 2, in the amphitheater of the Peter Bent Brigham Hospital, Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physic, Harvard Medical School and physician-in-chief, Peter Bent Brigham Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.



## BOSTON HEALTH LEAGUE

The annual meeting of the Boston Health League will be held on Thursday evening, March 2, at The Sheraton, Bay State Road, Boston, at 6 30. The program includes dinner, a short business meeting and a guest speaker Mr. George St. J. Perrott, secretary of the Interdepartmental Committee to Co-ordinate Health and Welfare Activities, of Washington, District of Columbia, will speak on 'Community Services and the National Health Program.'

Reservations for dinner, \$1.50 a plate, should be made at the office of the Boston Health League, 80 Federal Street, before February 28 (LIB 8515). Physicians unable to attend the dinner are invited to come and hear Mr. Perrott at 8 00.

## QUINCY CITY HOSPITAL

A series of Sunday afternoon health lectures will be given under the auspices of the Quincy City Hospital in the administration building at 3 00 p. m., beginning March 5 and ending May 7, 'Hospital Sunday'. These lectures will be given in preparation for the observance of National Hospital Day, Friday, May 12. Admission will be free and restricted to adults. The schedule is as follows:

March 5 Broken Bones How they should be handled and treated.

Stomachaches Appendicitis and gall-bladder disease.

March 12. Diabetes Its causes and latest treatment. Good Mental Hygiene in the Home.

March 19 Cancer—Tumors Causes and treatment.

March 26 Food—Weight—Health

April 2. What Not to Feed Your Baby  
Moving Picture—'Child Hygiene.'

April 9 Prenatal and Postpartum Care of the Mother and Child.

April 16 The Prevention and Care of Infections.  
Nursing Procedures

April 23 Pneumonia Its causes and treatment.  
Sound Moving Picture—'Pneumonia.'

April 30 Common Skin Diseases and Their Treatment.

Sound Moving Picture—'Tuberculosis.'

May 7 Nursing Procedures in a Modern Hospital.  
Hospital Insurance and Social Security

## EDWARD K. DUNHAM LECTURES

The Faculty of Medicine of Harvard University has announced that the following lectures will be given by Dr. K. Linderstrom Lang, director of the Chemical Department, Carlsberg Laboratory, Copenhagen, under the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences:

Monday, March 6 Micromethods for the Determination of Enzymes.

Wednesday, March 8 Distribution of Enzymes in Cells and Tissues

Friday, March 10 Proteins and Proteolytic Enzymes  
These lectures are scheduled for 5 00 p. m. at the Harvard Medical School, Amphitheater, Building C

UNITED STATES CIVIL SERVICE  
EXAMINATION

Physiotherapy Aide, \$1,800 a Year

Physiotherapy Pupil Aide, \$1,440 a Year

Applications must be on file with the United States Civil Service Commission at Washington, District of Columbia, not later than March 13.

Applicants for the physiotherapy aide must have been graduated from a school of physiotherapy meeting the standards established by the American Medical Association, or must have had at least eighteen months of experience as a classified pupil aide in physiotherapy in a Veterans' Administration Facility.

Applicants for the physiotherapy pupil aide must have successfully completed a full four-year high-school course or they must have successfully completed at least fourteen units of high school study acceptable for college entrance.

## SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING  
MONDAY, FEBRUARY 27

## MONDAY FEBRUARY 27

\*8 15 p. m. New England Heart Association Peter Bent Brigham Hospital

## TUESDAY FEBRUARY 28

\*9 10 a. m. Joseph H. Pratt Diagnostic Hospital. Diabetic Clinic. Dr. Joseph Rosenthal

\*10 a. m. 12 30 p. m. Tumor clinic. Boston Dispensary

5 p. m. Hospital Research Council. Ether Dome of the Massachusetts General Hospital

\*8 15 p. m. Harvard Medical Society Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance)

## WEDNESDAY MARCH 1

\*9 10 a. m. Joseph H. Pratt Diagnostic Hospital. Hospital case presentation. Dr. S. J. Thannhauser

\*12 m. Clinicopathological conference. Children's Hospital amphitheater

## THURSDAY MARCH 2

8 30-9 30 a. m. Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals, held this week at the Peter Bent Brigham Hospital

\*9-10 a. m. Joseph H. Pratt Diagnostic Hospital. Some Aspects of the Social Setting of Medical Practice. Dr. Talcott Parsons.

\*3 30 p. m. Medical clinic at the Peter Bent Brigham Hospital

\*4 p. m. Tufts Medical Alumni Lecture.

5 p. m. Faulkner Hospital clinicopathological conference.

\*6 30 p. m. Boston Health League. The Sheraton 91 Bay State Road Boston.

## FRIDAY MARCH 3

9-10 a. m. Joseph H. Pratt Diagnostic Hospital. Title to be announced. Dr. E. D. Churchill

10 a. m. 12 30 p. m. Tumor clinic. Boston Dispensary

12 m. Clinical meeting of the Children's Medical Service. Massachusetts General Hospital Ether Dome.

12 m. Urological conference, Massachusetts General Hospital lower outpatient amphitheater

## SATURDAY MARCH 4

\*9-10 a. m. Joseph H. Pratt Diagnostic Hospital. Hospital case presentation. Dr. S. J. Thannhauser

\*10 a. m. 12 m. Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr. Henry A. Christian.

## SUNDAY MARCH 5

\*4 p. m. Illustrated public health lecture, Faulkner Hospital auditorium. The Surgical Treatment of Female Disorders. Dr. P. Francis Weiss.

\*4 p. m. Free public lecture, Harvard Medical School Amphitheater of Building D. Vitamin Deficiencies. Dr. S. Burt Wolbach.

Open to the medical profession.

FEBRUARY 24—Massachusetts Italian Medical Society. Page 312, issue of February 16.

FEBRUARY '26—Lecture at the Faulkner Hospital. Page 971 issue of December 15

FEBRUARY '26—Free Public Lecture, Harvard Medical School. Page 1056 issue of December 29

- FEBRUARY 26 — Beverly Hospital Public Health Lecture Page 1056 issue of December 29
- FEBRUARY 26 — Salem Hospital Public Health Lecture. Page 126 issue of January 19
- FEBRUARY 27 — New England Heart Association Page 267 issue of February 9
- FEBRUARY 28 — Hospital Research Council Page 312 issue of February 16
- FEBRUARY 28 — Harvard Medical Society Page 362
- MARCH 1 31 — Joseph H. Pratt Diagnostic Hospital Medical conference program Page 362
- MARCH 2 — Medical clinic Peter Bent Brigham Hospital Page 362
- MARCH 2 — Tufts Medical Alumni Lecture Page 362
- MARCH 2 — Faulkner Hospital clinicopathological conference. Page 361
- MARCH 2 — Boston Health League. Page 363
- MARCH 5 MAY 7 — Quincy City Hospital Lectures Page 363
- MARCH 6 8 and 10 — Edward K. Dunham Lectures Page 362
- MARCH 9 — Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill
- MARCH 9 11 — New England Hospital Association Page 267 issue of February 9
- MARCH 13 — Fourth Annual Postgraduate Institute Page 938 issue of December 8
- MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6 — American Board of Ophthalmology Page 126 issue of January 19
- MARCH 27 31 — American College of Physicians. Page 36 issue of July 7
- MAY 7 15 — International Congress of Military Medicine and Pharmacy Page 501 issue of September 29
- MAY 15 16 — American Board of Obstetrics and Gynecology Inc Page 218 issue of February 2
- MAY 15-19 — American Medical Association St. Louis Missouri
- JUNE 6 7 8 — Massachusetts Medical Society Worcester
- JUNE 12 17 — Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19
- JUNE 26-29 — National Tuberculosis Association Page 936 issue of December 8
- SEPTEMBER — Boston Psychoanalytic Institute Page 450 issue of September 22
- SEPTEMBER 11 15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8
- SEPTEMBER 15-28 — Pan Pacific Surgical Association Page 863 issue of November 24
- FALL 1939 — Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

- MARCH 1 — Lynn Hospital Clinic at 5 p m Dinner at 7 p m Speaker Dr John Rock Subject Endocrinology
- APRIL 5 — Addison Gilbert Hospital Gloucester Clinic at 5 p m Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy
- MAY 10 — Annual meeting Salem Country Club Peabody

### NORFOLK

FEBRUARY 28 — Page 312 issue of February 16

### SUFFOLK

- MARCH 29 — Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced
- APRIL 26 — Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

### WORCESTER

- MARCH 8 — Page 362
- APRIL 12 — Worcester Hahnemann Hospital
- MAY 10 — Worcester Country Club — Annual meeting

With the exception of the annual meeting in May all the meetings begin with a supper at 6 30 p m which is followed at 7 30 p m by the business and scientific sessions

## BOOK REVIEWS

*The Medical Applications of the Short Wave Current*  
William Bierman Including a discussion of its physical and technical aspects by Myron M. Schwarzschild  
379 pp Baltimore William Wood & Co., 1938 \$5.00

The principles of physics underlying short wave currents may hardly lay claim to being common knowledge. Considerable information of this type can be acquired by carefully studying—not merely reading—the first part of this book. Here we find ample clarification of such topics as inductance and capacity and their interrelation. The comparison of radio-tube and spark gap ap-

paratus and the discussion of frequencies and wave lengths will interest many a reader, since many manufacturers and dealers lay stress on these aspects of short wave machines.

This is followed by a section on temperature determinations, which are the backbone of short wave diathermy; whatever else may be said about these currents all agree that they are thermogenetic. Hence one welcomes the recorded observations of temperature changes in the human thigh produced by 6-, 12-, 18- and 24 meter wave lengths. These measurements were taken at skin surface, subcutaneously and in intramuscular areas as close as 0.3 cm. to the periosteum of the femur. There are also tables of temperature changes produced in the paranasal sinuses and in the female pelvis. The conclusion is drawn that over the range of wave lengths tested there is no appreciable difference in thermal effect, provided the intensity of the treatment is gauged by the sensation of the subject. Nor were there observed any distinct differences between radio-tube and spark gap machines or between coil and cuff technics in applying the electrode to the thigh.

A lengthy discussion of the physiologic responses to local heat and local short-wave currents follows. This deals with changes in the circulatory, digestive and nervous systems, effects on growth and reproduction, effects on bacterial infections and inflammations, and effects on cells and tumors. This chapter concludes with a consideration of the injurious effects of short wave currents.

While the authors admit that they are dubious of any effect produced by short-wave currents other than that of thermogenesis, they sum up the opinions and findings of those who claim special effects.

In the last section the technics of application and the treatment of various diseases are taken up. The cuts materially help the descriptions given in the text for the methods commonly and uncommonly used. References are frequently made to theoretical considerations which are presented in the first part of the book.

Drs. Bierman and Schwarzschild are to be congratulated on having made a very valuable contribution to the literature of short-wave currents and short wave therapy.

*Physical Diagnosis* Richard C. Cabot and F. Dennette Adams Twelfth edition 846 pp Baltimore William Wood & Co. 1938 \$5.00

Offered as the twelfth edition of a text first published thirty-eight years ago, this volume has little in common with the Cabot we were brought up on, beyond a scattered few of the old diagrams. Abandoning the senior author's original purpose of presenting an account of the diagnostic methods and processes needed by competent practitioners of the present date, the new book aims rather to discuss the physical signs of disease in their relation to symptomatology and clinical entities. Perhaps this currently popular method of teaching physical diagnosis is sound, but one cannot help believing that the second year medical student is hardly ready for it. His first need as he is initiated into the art of the clinic is for a propaedeutic manual. However, the book admirably fulfills its stated purpose, and will serve as a valuable though not exhaustive reference volume for the house officer and practitioner.

There are a few proofreader's errors, such as "Sprengel" for "Sprengel" (p. 180), "palpation" (p. 235), "Ludwig's angle for Louis's angle" (p. 244), "portodiastolic" (p. 260), "cirrhosis" (p. 479), "contra coup" (p. 790) and "guaze" (p. 764), but no important deviations from what is generally accepted as sound theory and established fact.

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NUMBER 9

## TREATMENT OF PNEUMOCOCCUS TYPE 3 PNEUMONIA WITH SPECIFIC SERUM AND SULFANILAMIDE\*

MAXWELL FINLAND, M.D.,† AND JOHN W. BROWN, M.D.‡

BOSTON

THE recent introduction of therapeutic anti-pneumococcus rabbit serums and of sulfanilamide and similar compounds have stimulated interest in the possibility of favorably influencing the severe and highly fatal pneumonias associated with the Type 3 pneumococcus. This paper deals primarily with the clinical results obtained at the Boston City Hospital, prior to July, 1938, in the treatment of 56 such cases with specific serum and sulfanilamide, used separately or in combination. In a number of these cases there was an opportunity to make immunological observations, the details of which are being reported elsewhere.<sup>1</sup>

The favorable reports of Heintzelman, Hadley and Mellon<sup>2</sup> and of Sadusk<sup>3</sup> on the treatment of Type 3 pneumonia with sulfanilamide are of interest but are not convincing. Only a small number of cases are included, and there were no patients with bacteremia who recovered. Bullowa<sup>4</sup> is quoted as having used the drug alone to treat 10 cases including 5 with bacteremia. Among his cases there were 2 deaths, both in bacteremic patients. The use of rabbit serum in the treatment of small numbers of cases of pneumococcus Type 3 pneumonia has been reported.<sup>5-9</sup> No convincing drops in death rates have been noted, but the survival of an occasional bacteremic patient is suggestive of beneficial therapeutic effect.

### PATIENTS, MATERIALS AND METHODS

All the patients included in this study had acute pulmonary infection with evidence from physical and x-ray examinations of either lobar or atypical (broncho-) pneumonia. In each case Type 3 pneumococci were obtained either from the blood culture or directly from one or more specimens of sputum by the Neufeld method or after mouse inoculation or both. The therapeutic serums used

were mostly concentrated rabbit serums supplied by the Lederle Laboratories, Incorporated, of Pearl River, New York. Experimental methods were used in the production and concentration of most of these serums. Their potency varied in different lots from 1000 to 5000 provisional units per cubic centimeter, but many lots were not standardized. One lot of unconcentrated rabbit serum was furnished by the Antitoxin and Vaccine Laboratory of the Massachusetts Department of Public Health. All the serums were given in graded doses intravenously with the same general precautions as were used for other horse or rabbit serums. Sulfanilamide was usually given by mouth, but in occasional severely ill patients it was given subcutaneously in 0.8 per cent solution in physiological saline. The usual dose was 8 gm. during the first eight to twenty four hours then 6 to 8 gm. daily, given in equal divided doses at four hour intervals, together with the same or half the amount of sodium bicarbonate. The dose was decreased or omitted when definite improvement was evident. Dosage was also varied to suit individual circumstances. The supply of serum available during this study was limited. When available its use was usually reserved for the patients who appeared most ill, and then sulfanilamide was also given. In some of the patients, treatment with serum was discontinued either because the supply was exhausted or, with some of the earliest experimental lots, because of severe reactions.

### IMMUNOLOGICAL STUDIES

In vitro studies were carried out to ascertain the effect of sulfanilamide and serum, alone or in combination, on the growth of Type 3 pneumococci in the blood of patients acutely ill with pneumonia due to this organism. The details of these studies and of the tests done in the same patients after treatment are presented elsewhere.<sup>1</sup> It suffices here to summarize the results of these studies and to give our interpretation of the significance of these results in understanding the effect of treatment on the mechanism of recovery in this disease.

It was found that sulfanilamide in concentrations of about 7 mg. or more per cent exerts a bacteriostatic action on large numbers of Type 3 pneumococci in the blood of non-pneumonic individuals or of patients ill with pneumonia due to

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- FEBRUARY 26—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29
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- MARCH 2—Faulkner Hospital clinicopathological conference. Page 361
- MARCH 2—Boston Health League. Page 363
- MARCH 5 MAY 7—Quincy City Hospital Lectures Page 363
- MARCH 6 8 and 10—Edward K. Dunham Lectures Page 362
- MARCH 9—Pentucket Association of Physicians, 8 30 p m Hotel Bartlett, 95 Main Street Haverhill
- MARCH 9 11—New England Hospital Association Page 267 issue of February 9
- MARCH 13—Fourth Annual Postgraduate Institute. Page 938 issue of December 8
- MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19
- MARCH 27 31—American College of Physicians Page 36 issue of July 7
- MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29
- MAY 15 16—American Board of Obstetrics and Gynecology Inc Page 218 issue of February 2
- MAY 15 19—American Medical Association St. Louis Missouri
- JUNE 6 7 8—Massachusetts Medical Society Worcester
- JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19
- JUNE 26 29—National Tuberculosis Association Page 936 issue of December 8
- SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22
- SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8
- SEPTEMBER 15 28—Pan Pacific Surgical Association Page 863 issue of November 24
- FALL 1939—Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

- MARCH 1—Lynn Hospital Clinic at 5 p m  
Speaker Dr John Rock Subject Endocrinology Dinner at 7 p m
- APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m  
Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy
- MAY 10—Annual meeting Salem Country Club Peabody

### NORFOLK

- FEBRUARY 28—Page 312 issue of February 16

### SUFFOLK

- MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced
- APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

### WORCESTER

- MARCH 8—Page 362
- APRIL 12—Worcester Hahnemann Hospital
- MAY 10—Worcester Country Club—Annual meeting
- With the exception of the annual meeting in May all the meetings begin with a supper at 6 30 p m which is followed at 7 30 p m by the business and scientific sessions

## BOOK REVIEWS

*The Medical Applications of the Short Wave Current*  
William Bierman Including a discussion of its physical and technical aspects by Myron M. Schwarzschild  
379 pp Baltimore William Wood & Co, 1938 \$5 00

The principles of physics underlying short wave currents may hardly lay claim to being common knowledge. Considerable information of this type can be acquired by carefully studying—not merely reading—the first part of this book. Here we find ample clarification of such topics as inductance and capacity and their interrelation. The comparison of radio-tube and spark gap ap-

paratus and the discussion of frequencies and wave lengths will interest many a reader, since many manufacturers and dealers lay stress on these aspects of short wave machines.

This is followed by a section on temperature determinations, which are the backbone of short wave diathermy; whatever else may be said about these currents all agree that they are thermogenetic. Hence one welcomes the recorded observations of temperature changes in the human thigh produced by 6-, 12-, 18- and 24 meter wave lengths. These measurements were taken at skin surface, subcutaneously and in intramuscular areas as close as 0.8 cm. to the periosteum of the femur. There are also tables of temperature changes produced in the paranasal sinuses and in the female pelvis. The conclusion is drawn that over the range of wave lengths tested there is no appreciable difference in thermal effect, provided the intensity of the treatment is gauged by the sensation of the subject. Nor were there observed any distinct differences between radio-tube and spark gap machines or between coil and cuff technics in applying the electrode to the thigh.

A lengthy discussion of the physiologic responses to local heat and local short wave currents follows. This deals with changes in the circulatory, digestive and nervous systems, effects on growth and reproduction, effects on bacterial infections and inflammations, and effects on cells and tumors. This chapter concludes with a consideration of the injurious effects of short wave currents.

While the authors admit that they are dubious of any effect produced by short-wave currents other than that of thermogenesis, they sum up the opinions and findings of those who claim special effects.

In the last section the technics of application and the treatment of various diseases are taken up. The cuts materially help the descriptions given in the text for the methods commonly and uncommonly used. References are frequently made to theoretical considerations which are presented in the first part of the book.

Drs Bierman and Schwarzschild are to be congratulated on having made a very valuable contribution to the literature of short wave currents and short wave therapy.

*Physical Diagnosis* Richard C Cabot and F Dennette Adams  
Twelfth edition 846 pp Baltimore William Wood & Co 1938 \$5 00

Offered as the twelfth edition of a text first published thirty-eight years ago, this volume has little in common with the Cabot we were brought up on, beyond a scattered few of the old diagrams. Abandoning the senior author's original purpose of presenting an account of the diagnostic methods and processes needed by competent practitioners of the present date, the new book aims rather to discuss the physical signs of disease in their relation to symptomatology and clinical entities. Perhaps this currently popular method of teaching physical diagnosis is sound, but one cannot help believing that the second year medical student is hardly ready for it. His first need as he is initiated into the art of the clinic is for a propaedeutic manual. However, the book admirably fulfills its stated purpose, and will serve as a valuable though not exhaustive reference volume for the house officer and practitioner.

There are a few proofreader's errors, such as 'Sprengel' for 'Sprengel' (p 180), 'palpation' (p 235), 'Ludwig's angle for Louis's angle' (p 244), 'portodiastolic' (p 265), 'cirrhosis' (p 479), 'contra coup' (p 790) and 'guage' (p 764), but no important deviations from what is generally accepted as sound theory and established fact.

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## TREATMENT OF PNEUMOCOCCUS TYPE 3 PNEUMONIA WITH SPECIFIC SERUM AND SULFANILAMIDE\*

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BOSTON

THE recent introduction of therapeutic anti-pneumococcus rabbit serums and of sulfanilamide and similar compounds have stimulated interest in the possibility of favorably influencing the severe and highly fatal pneumonias associated with the Type 3 pneumococcus. This paper deals primarily with the clinical results obtained at the Boston City Hospital, prior to July, 1938, in the treatment of 56 such cases with specific serum and sulfanilamide, used separately or in combination. In a number of these cases there was an opportunity to make immunological observations, the details of which are being reported elsewhere<sup>1</sup>.

The favorable reports of Heintzelman, Hadley and Mellon<sup>2</sup> and of Sadusk<sup>3</sup> on the treatment of Type 3 pneumonia with sulfanilamide are of interest but are not convincing. Only a small number of cases are included, and there were no patients with bacteremia who recovered. Bullowa<sup>4</sup> is quoted as having used the drug alone to treat 10 cases including 5 with bacteremia. Among his cases there were 2 deaths, both in bacteremic patients. The use of rabbit serum in the treatment of small numbers of cases of pneumococcus Type 3 pneumonia has been reported.<sup>5</sup> No convincing drops in death rates have been noted, but the survival of an occasional bacteremic patient is suggestive of beneficial therapeutic effect.

### PATIENTS, MATERIALS AND METHODS

All the patients included in this study had acute pulmonary infection with evidence from physical and x-ray examinations of either lobar or atypical (broncho-) pneumonia. In each case Type 3 pneumococci were obtained either from the blood culture or directly from one or more specimens of sputum by the Neufeld method or after mouse inoculation or both. The therapeutic serums used

were mostly concentrated rabbit serums supplied by the Lederle Laboratories, Incorporated, of Pearl River, New York. Experimental methods were used in the production and concentration of most of these serums. Their potency varied in different lots from 1000 to 5000 provisional units per cubic centimeter, but many lots were not standardized. One lot of unconcentrated rabbit serum was furnished by the Antitoxin and Vaccine Laboratory of the Massachusetts Department of Public Health. All the serums were given in graded doses intravenously with the same general precautions as were used for other horse or rabbit serums. Sulfanilamide was usually given by mouth, but in occasional severely ill patients it was given subcutaneously in 0.5 per cent solution in physiological saline. The usual dose was 8 gm. during the first eight to twenty-four hours, then 6 to 8 gm. daily, given in equal divided doses at four-hour intervals together with the same or half the amount of sodium bicarbonate. The dose was decreased or omitted when definite improvement was evident. Dosage was also varied to suit individual circumstances. The supply of serum available during this study was limited. When available, its use was usually reserved for the patients who appeared most ill, and then sulfanilamide was also given. In some of the patients, treatment with serum was discontinued either because the supply was exhausted or, with some of the earliest experimental lots, because of severe reactions.

### IMMUNOLOGICAL STUDIES

In vitro studies were carried out to ascertain the effect of sulfanilamide and serum, alone or in combination, on the growth of Type 3 pneumococci in the blood of patients acutely ill with pneumonia due to this organism. The details of these studies and of the tests done in the same patients after treatment are presented elsewhere.<sup>1</sup> It suffices here to summarize the results of these studies and to give our interpretation of the significance of these results in understanding the effect of treatment on the mechanism of recovery in this disease.

It was found that sulfanilamide in concentrations of about 7 mg. or more per cent exerts a bacteriostatic action on large numbers of Type 3 pneumococci in the blood of non-pneumonic individuals or of patients ill with pneumonia due to

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this organism, when such bloods alone lack pneumococidal activity. The drug probably does not influence phagocytosis in these bloods. It usually exerts no bactericidal effect in a concentration of 10 mg per cent but may do so occasionally with greater concentrations.

Patients with pneumococcus Type 3 pneumonia whose blood is bactericidal for pneumococci of this type during the acute disease and before treatment usually acquire homologous type-specific agglutinins, mouse-protective antibodies and phagocytic activity after treatment with either sulfanilamide or serum or both. Blood invasion does

either the serum or the sulfanilamide are used separately.

In patients whose blood lacks pneumococidal properties, treatment with sulfanilamide probably renders the blood bacteriostatic until heat stable specific antibodies (agglutinins and mouse protective antibodies) develop or until a balance of such antibodies is passively introduced. When such heat-stable antibodies are acquired, the pneumococcal infection usually subsides. With specific antiserum in proper amounts, the infection may be overcome without the additional use of sulfanilamide, especially in patients who are not

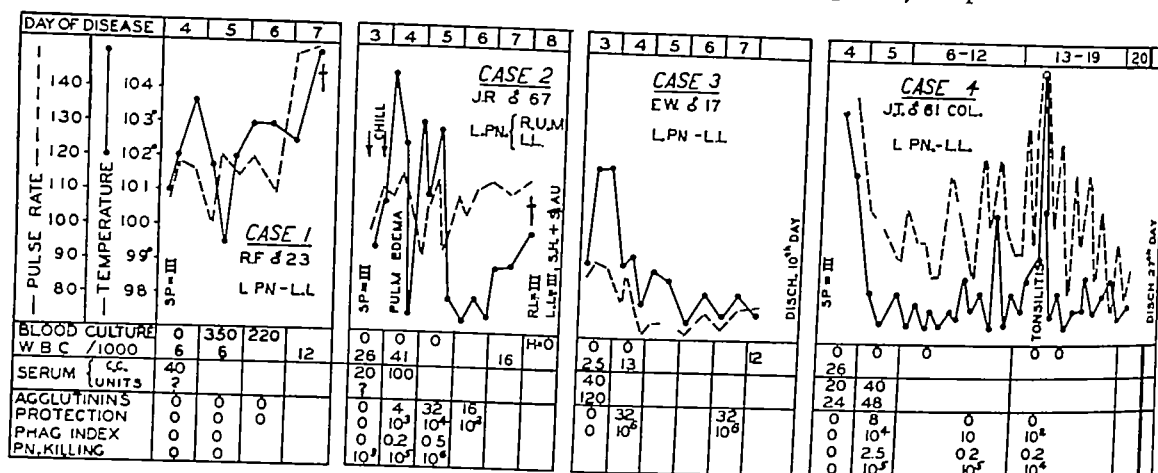


Figure 1 Patients Treated with Specific Serum

not occur after treatment in such cases, and if death occurs, it is usually a result of a superinfection or of other conditions not directly related to the Type 3 infection. In an occasional patient the pulmonary process extends in spite of the presence of circulating antibodies and in the absence of bacteremia.

Therapeutic Type 3 antipneumococcus rabbit serums induce pneumococidal activity in the blood of patients ill with pneumonia due to this type. These antiserums and sulfanilamide used together produce a greater bacteriostatic and bactericidal effect than when equivalent amounts of

heavily infected. Death may occur in either event, but under such circumstances it is due either to complications or to conditions not related to the Type 3 infection.

Occasional patients recover following sulfanilamide therapy without the development of homologous type-specific antibodies. This may occur even when the Type 3 pneumococcus has been recovered from the blood stream.

#### CLINICAL RESULTS

The pertinent data in each of the treated patients in whom special immunological studies

#### EXPLANATION OF FIGURES 1-3

**Blood culture** 0 = no growth + = positive for pneumococcus Type 3  
Numbers represent number of colonies of pneumococcus Type 3 per cubic centimeter of blood

**W B C** White blood corpuscles — in thousands per cubic millimeter

**Serum** Type 3 antipneumococcus rabbit serum. After units, the numbers represent thousands of units. (The unit is defined as ten times the smallest amount of serum which protects 50 per cent of mice against 100 fatal doses of Type 3 pneumococci.)

**Agglutinins** 0 = absent 2 4 etc = greatest dilution of serum in which floccular agglutination occurred

**Protection** The numbers represent the largest number of fatal doses of Type 3 pneumococci which mice survived with the simultaneous injection of 0.2 cc. of serum

**Phag index** Average number of diplococci per polymorphonuclear leukocyte in the phagocytic test.

**Pn killing** Maximum number of Type 3 pneumococci which were killed in 0.5 cc of fresh defibrinated blood

#### Abbreviations

P.A.B.S. = para aminobenzenesulfonamide (sulfanilamide)  
SP = sputum  
PN III = pneumococcus Type 3  
L.P.N. = lobar pneumonia  
BR. = atypical (broncho-) pneumonia  
R. U. M. = right upper and middle lobes  
L. L. = left lower lobe  
R. L. = right lower lobe etc  
S.H. = *Streptococcus hemolyticus*  
S.A.U. = *Staphylococcus aureus*  
H.I.N.F. = *Haemophilus influenzae*  
HGB = hemoglobin (Sahli)  
T = transfusion the number represents the amount of blood in cubic centimeters  
† = expired.

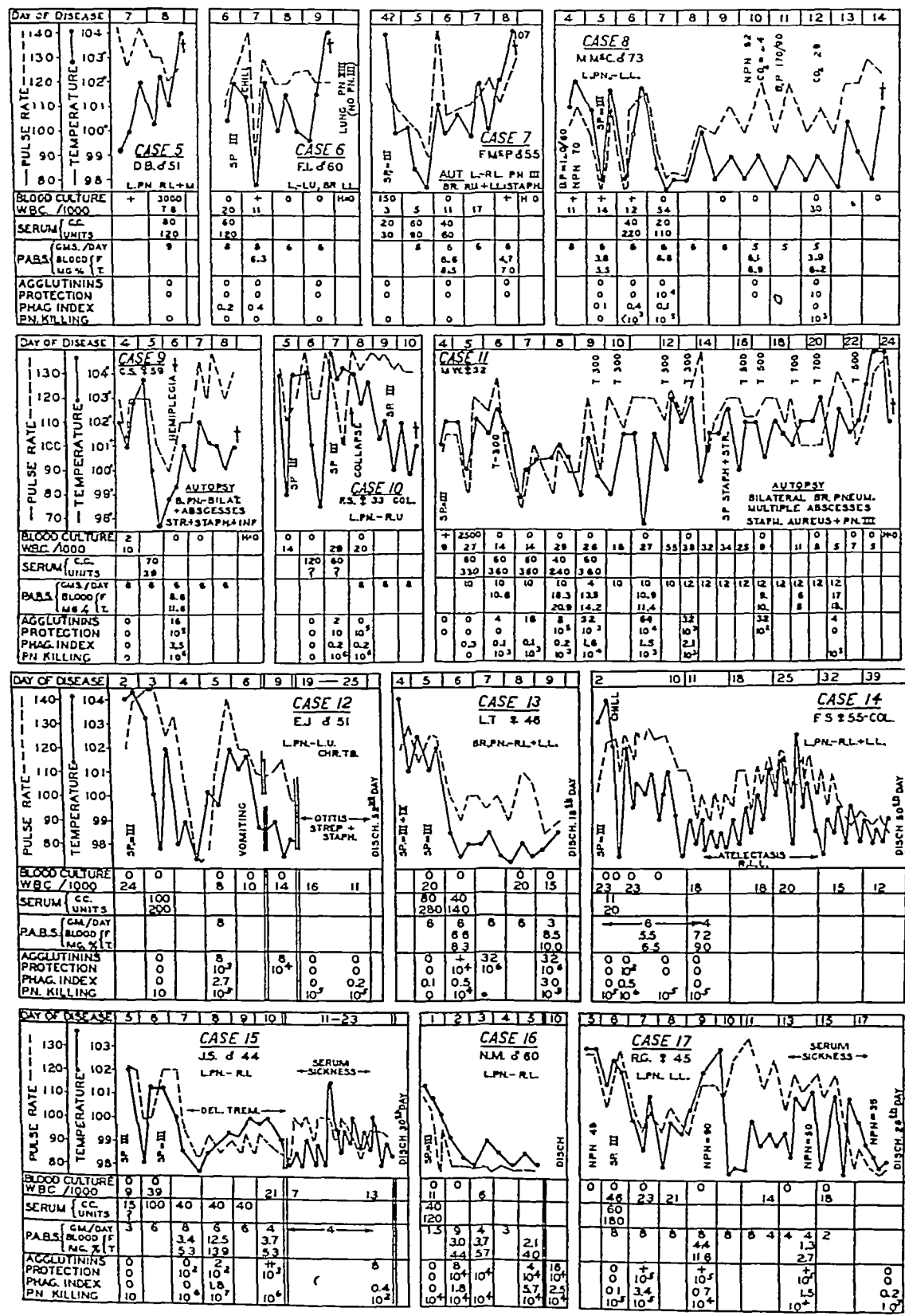


Figure 2 Patients Treated with Specific Serum and Sulfanilamide

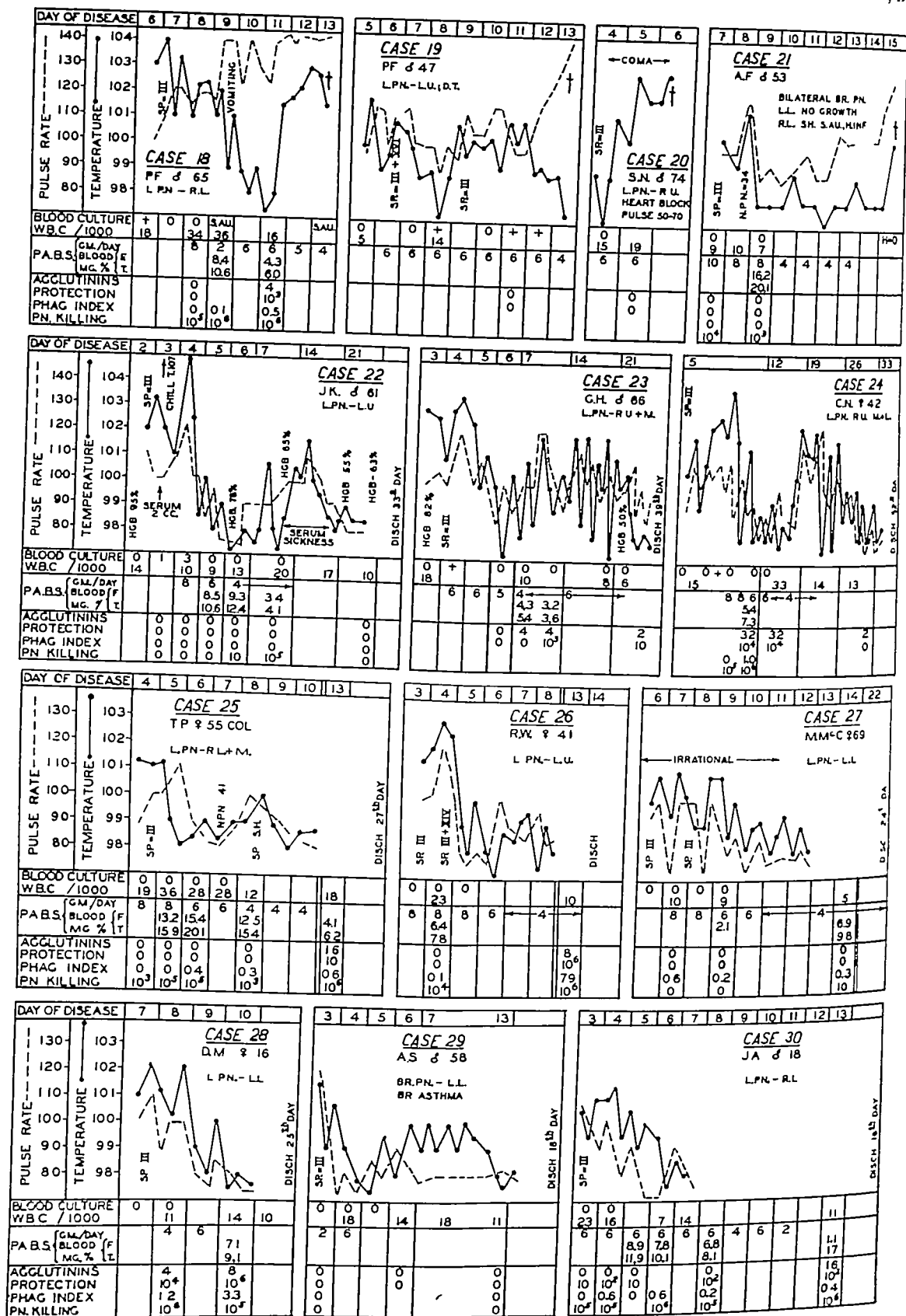


Figure 3 Patients Treated with Sulfanilamide



Table 1 Summary of Additional Cases of *Pneumococcus Type 3 Pneumonia* Treated with *Sulfanilamide*

CASE	NAME	SEX	AGE	PNEUMONIA TYPE	LOBE INVOLVED†	BLOOD CULTURES RESULTS	DAYS TAKEN	BLOOD LEUKO CYTE COUNTS X 10 <sup>9</sup>	SULFANILAMIDE DAYS GIVEN	TOTAL DOSE gm	TERMINATION MODL	DAY	REMARKS
31	A C	F	51	Lobar	Ll	Sterile	4 5	12 16	4 5	10	Lysis	4 5	Improving before treatment
32	M H	F	55	Lobar	Rl	Sterile	3	22	3 12	49	Crisis	7	
33	G B	M	66	Lobar	Rm	Sterile	4	—	4	5	Death	5	
34	A H	M	51	Lobar	Rumil	In 3 Sterile	2 3 6 9 10 11 16	9-42	3 16	70	Death	16	N P N 30 and 120 mg per cent on 2nd and 12th days respectively; transfusions
35	P J	M	70	Lobar	Ll	Sterile	7	10	7 8	16	Crisis	7	Crisis on admission
36	J B	M	62	Lobar	Rl	—	—	6	4 5	18	Death	5	1 osteoporative pneumonia (gastroenterotomy); also Prontosil 30 cc intra muscularly
37	J C	M	63	Lobar	Rl Ll	Sterile	3 4 5	9 22	4 11	43	Death	11	Delirium (? alcoholism)
38	M S	F	66	Lobar	Rl	Sterile	4 5 6 7 16	10 15	5 7	8	Lysis	15	Marked nausea
39	J B	M	43	Atypical	Ll	Sterile	1	13	1 10	44	Crisis	2	Rapid improvement
40	J D	M*	49	Atypical	Bilateral	B colr Sterile	15 20 22+	20 39	19 29	48	Lysis	27+	Pneumonia complicating periurethral abscess and <i>B. coli</i> sepsis
41	M W	F	39	Lobar	Rumil Lul	—	—	14	4 6	18	Lysis	8	Alcoholism
42	I C	M	42	Lobar	Rl	Sterile	2 4 6 9	17	2 13	57	Crisis	9	
43	R H	M	22	Lobar	Rl	Sterile	2 3 5 8	31	2 14	66	Crisis	9	
44	A I	M	48	Lobar	Rl	Sterile In 3	3 4 5 6	16-21	5	6	Death	6	Sputum Pn 15 (no Pn 3)
45	M O	F	72	Atypical	Rl Ll	Sterile	6 7 8	10	8 11	18	Crisis	8	Congestive heart failure
46	D C	F	57	Atypical	Ll	Sterile	1 2 3	16	1 2	14	Crisis	2	
47	M N	F	49	Lobar	Rumil	Pn 3	13	29	13	6	Death	14	
48	M B	F	65	Atypical	Rl	Sterile	4 5 6	27	4 6	18	Crisis	4	
49	R S	M	62	Atypical	Rl	Sterile	6 15	12	8-15	48	Lysis	10+	Otitis media on 6th day mastoidectomy on 30th day
50	J S	M	42	Atypical	Rl	Sterile	many	13 29	10 60	216	Death	60	Bronchiectatic abscesses
51	A C	F	38	Lobar	Rumil	In 3	7 8	14	7	6	Death	8	Extended to Rn
52	J M	M	48	Atypical	Rl Ll	Sterile	4 9	15 11	4 13	77	Death	13	Active rheumatic carditis
53	R M	M	24	Lobar	Rul Ll	Sterile	10	10-18	2-4	9	Crisis	13	
54	J M	M	72	Lobar	Ru	—	—	10	10 13	32	Death	17	Temporary improvement
55	A I	M	16	Lobar	Bilateral Rl Ll	Sterile	7 20 37	9 23	9 14 23-43	30 46	Lysis Crisis	24 37	Otitis media ( <i>Sir hem</i> ) on 24th day; relapse of pneumonia on 32nd day
56	J N	F	22	Lobar	Ru Rl Ll	Sterile	3	28-16	4 5	8	Death	5	Postpartum pneumonia rheumatic heart disease decompensated

Colored

†R = right; L = left; u = upper; m = middle; l = lower

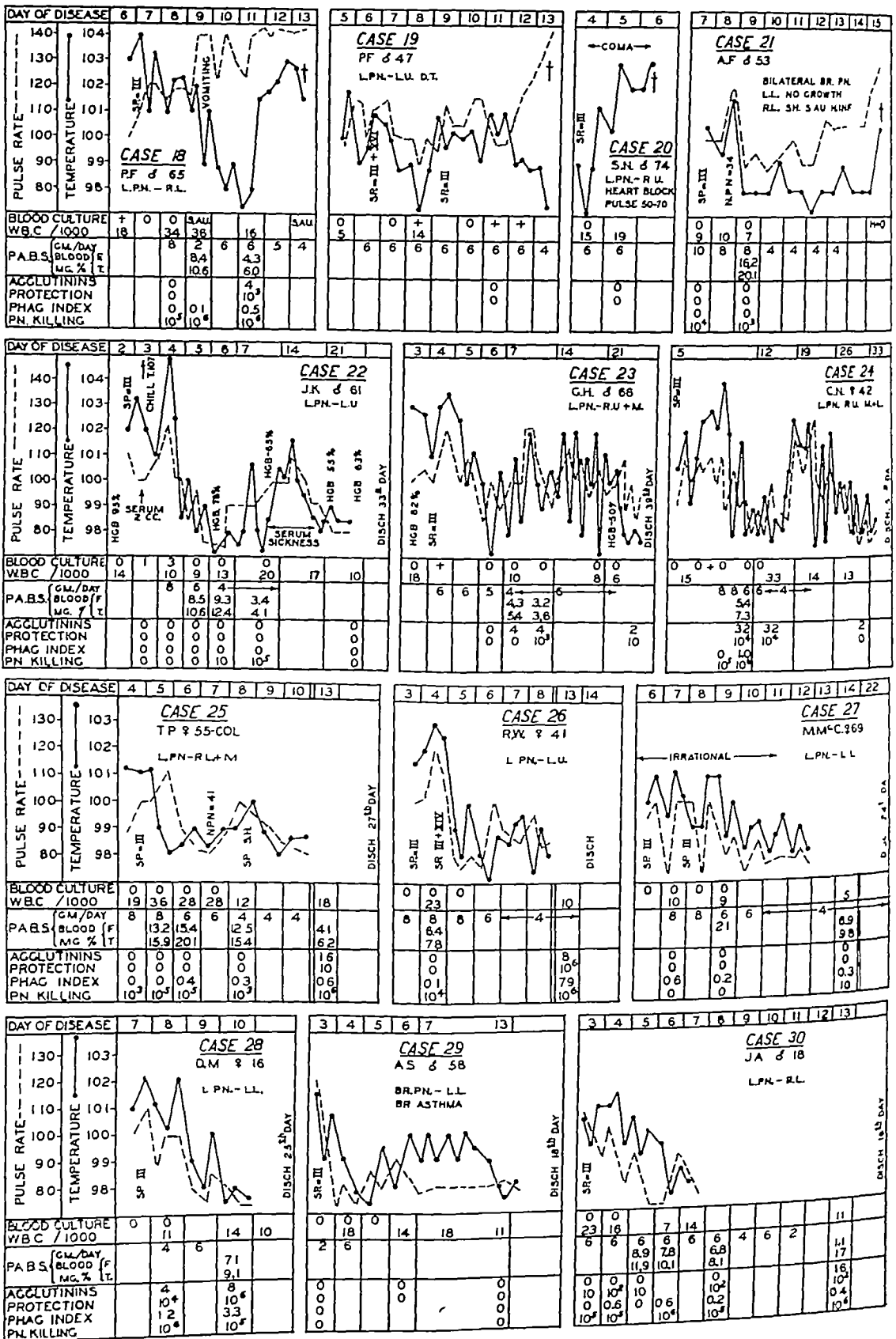


Figure 3 Patients Treated with Sulfanilamide

Table 1 Summary of Additional Cases of *Pneumococcus Type 3 Pneumonia* Treated with Sulfanilamide

CASE	NAME	SEX	AGE	TYPE OF PNEUMONIA	LOBES INVOLVED†	BLOOD CULTURES	BLOOD CULTURE RESULT	DAYS TAKEN	BLOOD CULTURE COUNTS	SULFANILAMIDE DAYS GIVEN	TOTAL DOSE gm	TERMINATION MODA	DAY	REMARKS
31	A. C.	I	51	Lobar	LI	Sterile	Sterile	4 5	12 16	4 5	10	Lysis	4 5	Improving before treatment
32	M. H.	I	55	Lobar	RI	Sterile	Sterile	3	22	3 12	49	Crisis	7	
33	G. H.	M*	66	Lobar	Rm	Sterile	Sterile	4	—	4	5	Death	5	
34	A. H.	M	51	Lobar	Ruml	In 3 Sterile	Sterile	2 3 6 9 10 11 16	9-42	3 16	70	Death	16	N 1 N 30 and 120 mg. per cent on 2nd and 12th days respectively; transfusions
35	J. I.	M	70	Lobar	LI	Sterile	Sterile	7	10	7 8	16	Crisis	7	Crisis on admission
36	J. H.	M	62	Lobar	RI	—	—	—	6	4 5	18	Death	5	Postoperative pneumonia (parotidectomy); also Prontoil 30 cc intra muscularly
37	J. C.	M	63	Lobar	RI LI	Sterile	Sterile	3 4 5	9 22	4 11	43	Death	11	Delirium (? alcoholism)
38	M. S.	F	66	Lobar Atypical	RI LI	Sterile	Sterile	4 5 6 7 16	10 15	5 7	8	Lysis	15	Marked nausea
39	J. H.	M	43	Atypical	LI	Sterile	Sterile	1	13	1 10	44	Crisis	2	Rapid improvement
40	J. D.	M*	49	Atypical	Bilateral	In 70 Sterile	Sterile	15 20 22+	20-39	19 29	48	Lysis	27 1-	Pneumonia complicating, pericardial abscess and <i>B. coli</i> sepsis
41	M. W.	F	39	Lobar Atypical	Ruml Lob	—	—	—	14	4 6	18	Lysis	8	Alcoholism
42	P. C.	M	42	Lobar	RI	Sterile	Sterile	2 4 6 9	17	2 13	57	Crisis	9	
43	R. H.	M	22	Lobar	RI	Sterile	Sterile	2 3 5 8	31	2 14	66	Crisis	9	
44	A. I.	M	48	Lobar	RI	Sterile In 3 6	Sterile	3 4 5 6	16-21	5	6	Death	6	Sputum Pn 15 (no Pn 3)
45	M. O.	F	72	Atypical	RI LI	Sterile	Sterile	6 7 8	10	8-11	18	Crisis	8	Congestive heart failure
46	R. C.	I	57	Atypical	LI	Sterile	Sterile	1 2, 3	16	1 2	14	Crisis	2	
47	M. N.	I	49	Lobar	Ruml	Pn 3	Pn 3	13	29	13	6	Death	14	
48	M. H.	I	65	Atypical	RI	Sterile	Sterile	4 5 6	27	4 6	18	Crisis	4	Otitis media on 6th day mastoidectomy on 30th day
49	R. S.	M	62	Atypical	RI	Sterile	Sterile	6 15	12	8-15	48	Lysis	10+	Bronchiectatic abscesses
50	J. S.	M	42	Atypical	RI	Sterile	Sterile	many	13 29	10 60	216	Death	60	Extended to 8th
51	A. C.	I	38	Lobar	Ruml	Pn 3	Pn 3	7 8	14	7	6	Death	8	Active rheumatic carditis
52	J. M.	M	48	Atypical	RI LI	Sterile	Sterile	4 9	15 11	4 13	77	Death	13	
53	R. M.	M	24	Lobar	Rul LI	Sterile	Sterile	10	10 18	2-4	9	Crisis	13	
54	J. M.	M	72	Lobar Atypical	Ru Bilateral	—	—	—	10	10 13	32	Death	17	Temporary improvement
55	A. I.	M	16	Lobar Relapse	RI LI RI	Sterile	Sterile	7, 20 37	9 23	9 14 23-43	30 46	Lysis Crisis	24 37	Otitis media (Sir Alex) on 24th day; relapse of pneumonia on 32nd day
56	J. M.	F	22	Lobar Atypical	Ru RI LI	Sterile	Sterile	3	28-16	4 5	8	Death	5	Postpartum pneumonia; rheumatic heart disease decompensated

\*Colored

†R = right; L = left; u = upper; m = middle; l = lower

were made are shown in the accompanying charts. These include all the patients treated with specific serum, either alone (Cases 1-4) or in addition to sulfanilamide (Cases 5-17), and also a few of the patients who received only the drug (Cases 18-30). The essential features of the remaining patients who were treated with sulfanilamide alone (Cases 31-56) are listed in Table 1.

There were 24 deaths among the 56 treated cases, a mortality of 43 per cent. During the two-year period from July, 1936, to July, 1938, there were 135 patients with pneumococcus Type 3 pneumonia who received neither serum nor sulfanilamide, and 64 of these patients died, a mortality of 47 per cent. The death rates in these

In interpreting these data it is important to bear in mind certain features in the cases chosen for treatment. It has been pointed out previously that the supply of serums available during the period of this study was limited and included a number of experimental lots of low or unknown potency. In a number of cases, serum administration had to be discontinued because the available supply was exhausted or because of untoward reactions. All these cases have been included in the figures presented. Furthermore, in certain of the cases the bacteriological and autopsy findings indicated that the failures in treatment were associated with other factors not directly related to the Type 3 pneumococcus infection. It is of interest, therefore, to note

Table 2 Summary of Death Rates from Pneumococcus Type 3 Pneumonia, Boston City Hospital, 1936-38

CASE GROUPS		CASES TREATED WITHOUT SERUM OR SULFANILAMIDE*			CASES RECEIVING SULFANILAMIDE ALONE		CASES RECEIVING SERUM WITH OR WITHOUT SULFANILAMIDE†		CASES RECEIVING SULFANILAMIDE OR SERUM OR BOTH		PER CENT DIED
		NUMBER	DIED	PER CENT DIED	NUMBER	DIED	NUMBER	DIED	NUMBER	DIED	
Age (years)	12-29	16	2	13	7	1	22	11	9	2	22
	30-49	36	14	39	12	6	5	2	17	8	47
	50-69	66	38	58	17	6	9 <sup>a</sup>	5 <sup>a</sup>	26	11	41
	70+	17	10	59	3	2	1	1	4	3	75
Blood culture	Positive	26	25	94	9	6	7 <sup>a</sup>	7 <sup>a</sup>	16	13	81
	Negative	85	32	38	27	7	10 <sup>a</sup>	2 <sup>a</sup>	37	9	24
	Not done	24	7	29	3	2	—	—	3	2	67
	All cases	135	64	47	39	15	17 <sup>a</sup>	9 <sup>a</sup>	56	24	43

Cases in which the type was obtained at autopsy are omitted (there were 20 such cases)

†Four cases received serum alone; they are indicated by the superscripts

two groups of cases are shown in Table 2, the cases being arranged in different age groups and according to the results of blood cultures. Bacteremia was more frequent in the treated cases, particularly among those who received both serum and sulfanilamide. The death rate in the 37 non-bacteremic patients who received serum or sulfanilamide or both was 24 per cent, as compared with a 38 per cent mortality in 85 cases treated without these agents. There was a single recovery among the 26 untreated bacteremic patients, whereas 3 of the 16 treated bacteremic patients recovered. Each of the latter 3 survivals received sulfanilamide alone.

Taken as a whole, the duration of the acute disease was somewhat longer in the patients treated with serum or sulfanilamide or both than in the untreated cases (Fig. 4). This was true for both the fatal and the recovered cases. The average duration of the acute illness in the patients who recovered was 7.8 and 7.3 days for the treated and untreated cases respectively. The average duration of the disease in the fatal cases which received serum or sulfanilamide or both was 11.3 days, as compared with 9.1 days in the untreated fatal cases.

briefly some of the more important features of the treated cases.

*Cases Treated with Serum Alone.* Only 4 patients were treated with specific serum alone and

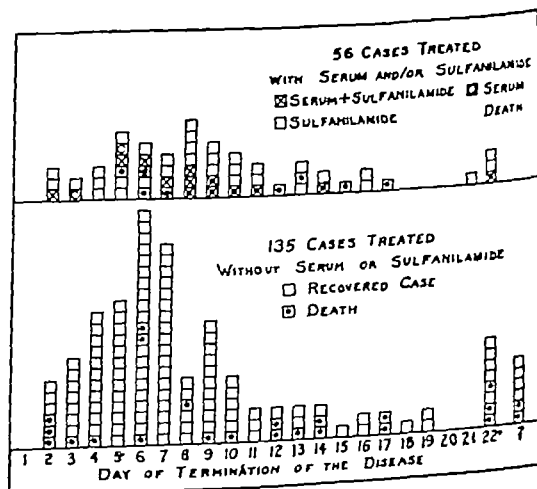


Figure 4 Duration of Disease in Type 3 Pneumococcus Pneumonia

2 of them died (Fig. 1). In Case 1 the dose was obviously inadequate in view of the severe infec-

tion Antibodies could not be demonstrated in the blood after treatment, and heavy bacteremia ensued In the other patients a balance of antibodies was readily established and maintained In Case 2, serum administration was accompanied by moderately severe chills and was followed by the development of intractable pulmonary edema, the pneumonia extended in spite of sterile blood cultures and the presence of a balance of antibodies The other 2 patients had prompt clinical improvement.

*Case Treated with Serum and Sulfanilamide* There were 7 deaths among the 13 patients who received the combined therapy (Fig 2) Bacteremia was demonstrated in 6 of these fatal cases and was of severe grade in 3 In only 1 of the 7 fatal cases was serum treatment begun before the fifth day In Case 5, treatment was started on the eighth day, a blood culture taken before the first dose of serum was given yielded 3000 colonies of Type 3 pneumococci per cubic centimeter and the patient died within a few hours In Case 6 and Case 7 the amounts of serum given were not sufficient to establish a balance of specific antibodies, and bacteremia was present irregularly after the serum had been given and while the patients were receiving sulfanilamide In Case 6 blood cultures were sterile during the last two days of life, and at autopsy no Type 3 pneumococci were found in cultures from the lungs

In 3 bacteremic patients (Cases 8, 9 and 11) a balance of antibodies was established and maintained and the Type 3 infection was apparently controlled One of these patients (Case 8) died in uremia a week after apparent recovery from the pneumonia The second patient (Case 9) had a cerebral hemorrhage and hemiplegia on the second day after treatment and after an apparent crisis, death occurring two days later No pneumococci could be recovered from the lungs of this patient The third patient (Case 11) had a heavy bacteremia This patient lived for twenty days under intensive treatment, during which severe anemia developed and required several transfusions Repeated blood cultures taken after treatment were sterile Autopsy revealed numerous large abscess cavities, the contents of which yielded Type 3 pneumococcus and *Staphylococcus aureus* on culture

In Case 10, circulatory collapse and pulmonary edema developed on the second day after treatment, and persisted Blood cultures taken before and after treatment were sterile, but the patient had a high fever, delirium and marked prostration at the time treatment was begun

The 6 patients (Cases 12-17) who recovered fol-

lowing combined therapy all had sterile blood cultures throughout the course of their disease They showed marked clinical improvement with respect to their pneumonia within a few hours after serum treatment was given A balance of antibodies was demonstrated in each case In 4 of these 6 cases, treatment was begun before the fifth day of the disease

*Patients Treated with Sulfanilamide Alone* The 13 patients of this group in whom immunological studies were made are of special interest and should be considered separately (Fig 3) Four of these 13 patients died, including 2 who had positive blood cultures Treatment with the drug was begun on the fourth day in 1 of these patients (Case 20) and on the sixth day or later in the other 3 Following treatment with the drug, 1 of the bacteremic patients (Case 18) developed a balance of type-specific antibodies, but a hemolytic *Staphylococcus aureus* was recovered from two blood cultures subsequently A second patient (Case 21) had sterile blood cultures throughout and died after eight days of treatment Cultures of the lungs yielded streptococci, staphylococci and influenza bacilli, but no Type 3 pneumococci

Three bacteremic patients recovered following sulfanilamide therapy One of them (Case 22) was given a single trial dose of 2 cc of serum on the third day of his disease This was followed by a severe chill with a rise in temperature to 107°F., and serum therapy was discontinued Blood cultures taken before this serum injection and again on the following day just prior to the first dose of sulfanilamide were both positive for Type 3 pneumococci Crisis occurred on the fifth day Pneumococcal activity was demonstrated in this patient's blood on one occasion after crisis, but specific agglutinins and mouse protective antibodies for the homologous type of pneumococcus could not be demonstrated The second patient (Case 23) had a sterile blood culture on the third day, but the one taken the next day, just before beginning sulfanilamide therapy, was positive for Type 3 pneumococci Crisis two days later was followed by the development of specific agglutinins and protective antibodies, but fever persisted during the next two weeks, presumably due to the continued drug therapy These last 2 patients developed moderately severe anemia with drops in hemoglobin of 40 and 32 per cent respectively, after a week or more of treatment The third patient (Case 24) had transient bacteremia, but a blood culture taken on the ninth day just before sulfanilamide treatment was begun was sterile Crisis associated with a high titer of specific antibodies occurred on the following day

Of the 6 non-bacteremic patients (Cases 25-30) in this group who recovered 4 developed homologous antibodies. One (Case 29) of 2 patients in whom such antibodies did not develop had asthma and atypical pneumonia with only slight pulmonary involvement, but the other (Case 27) had lobar pneumonia and was acutely ill and irrational for several days.

The remaining 26 cases treated with sulfanilamide alone are listed in Table 1. There were 4 bacteremic patients among them and all 4 died. Three of them were treated for only one day. In the fourth patient (Case 34) treatment was begun on the third day, all subsequent blood cultures were sterile, the patient developed anemia and nitrogen retention and died, in spite of repeated transfusions. There were 7 other deaths in this group, 5 in patients with sterile blood cultures and 2 in those from whom blood cultures were not made. Three of these 7 deaths occurred on the fifth day of the disease and after only a single day of sulfanilamide treatment. Death was delayed a week or more in the other 4 cases.

Among the 15 patients in this group who recovered, crisis was prompt in 6 cases, including 4 (Cases 31, 39, 46 and 48) in which treatment was begun on or before the fourth day. In the remaining cases recovery was delayed from two to ten or more days.

#### DISCUSSION

The clinical results, when considered from the point of view of the effect of treatment on the death rate and on the duration of the acute disease, are not very impressive. Scrutinized more closely, however, they indicate that we are dealing with two useful therapeutic agents. The appreciably lower death rate in the non-bacteremic cases suggests that blood invasion may have been prevented by treatment in some of them. The 3 bacteremic recoveries are of some interest because of the rarity with which recoveries are encountered in pneumonias with Type 3 pneumococcus bacteremia, even of low grade. It is possible that 2 of these patients would have recovered spontaneously, since antibodies developed after the sulfanilamide therapy, but this was not true in the third case.

Furthermore, the bacteriological, immunological and autopsy findings in some of the fatal cases strongly suggest that both the drug and the antiserum, but particularly the combination of the two, had marked curative effect on the Type 3 in-

fection. Adequate causes for death, apart from the specific infection, were found in an appreciable number of these fatal cases. In addition, we must consider the severity of the cases chosen for treatment, the experimental character, inadequate amounts and low potency of the serums available during this study, and the fact that we were dealing with a group of old and severely ill patients in whom sulfanilamide therapy is frequently difficult to control properly. The lots of serum which became available toward the end of this study and which have been in use since have been considerably higher in potency and, aside from occasional mild chills, have not produced severe untoward reactions. All these considerations suggest that specific serum and sulfanilamide, both used in proper amounts, should give good therapeutic results and appreciably lower the death rate.

The studies are being continued at the Boston City Hospital. The action of sulfapyridine and its effect on the course of Type 3 pneumococcus pneumonia is being assessed. While it is yet too soon to draw final conclusions, the findings suggest that the combination of specific antipneumococcus rabbit serum and sulfapyridine exerts an optimum effect, both in vitro and in the patient.

#### CONCLUSIONS

The pertinent data concerning 56 cases of pneumococcus Type 3 pneumonia treated with specific antipneumococcus rabbit serums and sulfanilamide, separately or in combination, are presented.

While the death rate was not significantly lowered in the entire group of treated cases, a consideration of the effect of treatment in the individual cases, the bacteriological and immunological findings, and the circumstances surrounding some of the unfavorable results all suggest that the combination of specific serum and sulfanilamide is a useful and effective means of combating pneumococcus Type 3 pneumonia.

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## COMMENTS ON CLINICAL STUDIES IN PATIENTS WITH KIDNEY DISEASES

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DR DAVID MacKENZIE, of Montreal, recently stated that, in the field of medicine, "the space between knowledge and how to use it is still wide." One's knowledge of all the possible types of diseases causing symptoms in a patient may be adequate, but if that knowledge is not applied in reaching a diagnosis, the patient is being treated on the basis of a probable diagnosis rather than on that of a certain one.

At times, symptoms and signs caused by surgical disease of the genitourinary tract closely resemble those of one of the so-called medical conditions of the kidney. As an illustration, let me relate the recent experience of a young man who, because of albuminuria and microscopic hematuria, had been diagnosed by his physician as suffering from chronic nephritis. During a two-year period, in an effort to exclude all foci of infection, he had undergone tonsillectomy and the extraction of several teeth. Unfortunately, after these procedures the urinary findings remained unchanged. Eventually, urological study revealed a moderate-sized stone in the right renal pelvis. Removal of the stone allowed the patient a urine free of albumin and microscopic blood, and relieved his mind concerning the hazards of Bright's disease. Many individuals with the same urinary findings may, of course, be correctly diagnosed medically as victims of nephritis. Yet it is better to use one's knowledge of all possible causes of a certain syndrome and thus to obtain an accurate diagnosis, so that one can be as sure as possible that the treatment or regime advised is the best that is known. Today such study as may be necessary can usually be provided without undue risk or expense to the patient.

Among the commoner signs and symptoms which may indicate kidney disease are pain, albuminuria, pyuria and hematuria. One of the most important questions that we must decide is, Under what circumstances is it wise to consider the kidney condition purely a medical one? Or, to put it differently, when is urological study indicated? How should this be done?

The typical case of renal colic, with its customary radiation of pain toward the inguinal region and external genitalia, does not offer a serious clinical diagnostic problem, except for

the physician who attempts to tell the patient how large the stone is, where it is in the course of the renal pelvis or ureter and whether it will pass. It is difficult to estimate the size of a stone without x-ray evidence. In general, large kidney stones give rise to less acute pain than do small ones which are in process of descent. What is a rational course of study in the diagnosis of a renal or ureteral stone? The clinical diagnosis can, of course, be inferred from the acute colicky type of pain and from microscopic hematuria. We must remember, however, that any renal cause of hematuria can produce a colicky type of pain simply as a result of blood or a blood clot which descends the ureter. The pain of renal colic is therefore not positive evidence of stone. Even though all symptoms subside, it is wise, I believe, to obtain a plain film of the kidney and bladder regions, as well as intravenous pyelography, within seven days of the renal colic. If pain does not subside with morphine in the course of three or four hours, or if repeated attacks of colic ensue, more immediate x-ray study is indicated. Intravenous pyelography does not need to be done by the urologist alone, the procedure can be used freely by all those who practice medicine, if the following limitations are realized. First, generally speaking the contrast shadows are not so sharp as with retrograde filling. Secondly, poor or mediocre filling of the pelvis and calices may, because of this lack of contrast, give the impression that the kidney is probably normal, it is dangerous in these circumstances to assume its normalcy. Thirdly, the method when used in the diagnosis of hematuria does not give so accurate a picture of bladder disease as does cystoscopy. Fourthly, when intravenous pyelography is used for diagnosis in pyuria, the advantage it offers for determining the source of the infection remains a probability rather than a certainty.

When recent renal colic has occurred, only a few precautions need to be taken for intravenous pyelography. Restriction of fluids for six hours preceding the injection is advisable, the bowel should be as free as possible of gas, and inquiry should be made as to any allergic tendency. When properly performed, this study should give indication of the size and location of a stone, as well as of interference with kidney function.

We all examine individuals who have a dull,

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sometimes intermittent pain in the kidney region or the upper quadrant of the abdomen, or the so-called pain along the course of the ureter, pain which may be due to renal, ureteral, abdominal or perhaps pelvic disease. Suppose that a carefully taken history, abdominal palpation, pelvic and rectal examinations and urine analysis fail to clinch the diagnosis. It is possible or probable that a kidney is the source of the trouble, it is also possible that the bowel is responsible. How should one proceed? In such a case, if the urine sediment under microscopic examination shows no evidence of blood or infection, I should again prefer a plain film of the kidney, ureter and bladder region, with intravenous pyelography, followed by a gastrointestinal series, barium enema or other studies, if necessary. If the gastrointestinal studies are done first, opaque masses can be found by x-ray, sometimes for a period of days afterward. This condition holds true even following catharsis and enemas, and ruins any chance of immediate urological study. The reverse does not hold true: urological x-ray photography will not interfere with the making of abdominal studies on the following day. Therefore, when a differential diagnosis is considered, urological study should precede gastrointestinal study in order to save the patient time, as well as expense, if he is in a hospital. With obscure pain due to hydronephrosis, the intravenous pyelogram has an excellent chance of indicating the diagnosis. Retrograde pyelography, I believe, is preferable, however, in cases of obscure pain which show abnormalities in the urine sediment. Divided catheter specimens, split functions, and so forth, allow one to interpret the findings more accurately than can usually be done by intravenous pyelography.

Hematuria is a very important finding. The amount of blood is not necessarily so important. The presence of blood in the urine, either in gross or microscopic amounts, indicates serious disease of the urinary tract unless complete examination proves otherwise. To the physician, hematuria brings to mind many possibilities, such as acute nephritis, trauma, hemorrhagic infection, tumor, stone or tuberculosis in the urinary tract and blood dyscrasias. Urological study of hematuria should not necessarily be done on the day on which it occurs or is found. Two conditions which should be ruled out before cystoscopic study is undertaken are acute nephritis and hemorrhagic infection of the lower urinary tract. Clinical findings in acute nephritis are well known. Hemorrhagic cystitis, while less common, is a distinct clinical entity causing extreme bladder symptoms with gross hematuria at the onset of the infection. Bacteria and leukocytes

can be demonstrated in the urine along with erythrocytes. As the infection is often confined to the lower urinary tract, ureteral catheterization may introduce virulent bacteria into the kidneys and lead to pyelitis. If one allows the cystitis to subside with proper treatment for two or three weeks, cystoscopic study can be performed without risk. Often it is only microscopic hematuria that gives the lead to serious renal or bladder disease. The type of disease can often be diagnosed only from the anatomical and physiological findings—namely by cystoscopic, pyelographic and functional studies. It is true that the patient with the typical picture of acute nephritis is not a proper subject for pyelographic study, but some patients have been observed for months or longer as having a form of chronic nephritis with a very small trace of albumin and microscopic hematuria, or a low grade urinary infection with the slightest possible trace of albumin, even though the condition is actually due to some renal or bladder condition which can be corrected. The patient who has hematuria probably due to some medical condition of the kidney will not be harmed by x-ray study, intravenous pyelogram, bladder cystoscopy or retrograde pyelogram provided that renal function has not been impaired to the extent of elevation of the nonprotein nitrogen of the blood. If the findings of medical disease of the kidneys are confirmed by these methods, certainly the physician can treat his patient with all the more assurance. Just how soon complete study of the patient with hematuria is warranted is a question which is impossible to answer for all occasions, but in a given case either a capable physician or a urologist should be able to tell. In general, one should make an investigation—that is, complete renal and bladder study—as soon as acute nephritis and acute urinary infection have been ruled out. It is true that waiting for the next evidence of hematuria before investigation is a most dangerous practice as concerns the well-being of the patient.

Patients with pyuria or bacteruria constitute a definite group in any physician's practice. The old routine under which urotropin and sodium acid phosphate were prescribed on the discovery of pus cells in the urine with the expectation that the urine would automatically become crystal clear, is about as modern as a low tax rate.

It is true that many acute urinary tract infections prove self-limited if given reasonable medical treatment consisting of rest and generous quantities of liquids. The patient's history, symptoms and course of fever help to indicate whether the inflammatory process originated in the upper or the lower urinary tract. We know that in the febrile state, it is unwise to use mandelic acid,



with the necessary restriction of fluids, instead, we believe that the taking of liquids up to 4500 cc per day, combined with rest, is the best program. Mild alkalis such as potassium citrate and sodium bicarbonate are better tolerated than is urotropin, with its resultant acidification. It is not yet certain whether or not sulfanilamide should be used in acute, febrile, urinary infections. We believe that for progress to be considered satisfactory the temperature must be at or near normal within seven to ten days after the onset of the infection, and that if a spontaneous cure from the acute attack is to be accomplished the urine must be sterile within a month.

Three conditions in regard to infection of the urinary tract are indications for urological study: first, acute pyelitis which causes a fever for longer than ten days, second, any pyuria of longer than sixty days' duration, and third, the history or suspicion of stone and infection. In the case of prolonged fever, associated disease interfering with proper urinary drainage is most likely, or instead some such complication as true cortical infection or perinephric abscess may occur. In the case of chronic pyuria without a bladder residual, one might say, Why bother with urological study? Merely give an effective urinary antiseptic. Such a program, while feasible, ignores the anatomical condition of a kidney which because of some fundamental disease is harboring infection—disease which may be gradually interfering with the function of the kidney, and therefore needs correction, in addition to relief of the urinary infection. It is preferable to know whether there is such underlying disease before treating a chronic urinary infection. Tuberculosis, infected hydronephrosis, and so forth, may in that event be diagnosed and corrected before too great damage has been done. The presence of an obstructing ureteral or renal calculus with urinary infection always warrants surgical treatment.

Tuberculosis of the urinary tract may be considered along with pyuria. When can the clinician suspect tuberculosis rather than one of the commoner urinary infections? The onset of symptoms, of course, may be identical with a nonspecific pyelitis or cystitis, or may begin with renal pain. The presence of red blood cells in a specimen of urine containing leukocytes is a suspicious finding,

a catheterized specimen showing pyuria but no bacilli or cocci also suggests tuberculosis. The urine in renal tuberculosis is nearly always acid unless there is a superimposed secondary urinary infection.

Is tuberculosis of the urinary tract primarily a medical or a surgical condition? I believe it is nearly always both. We know that renal tuberculosis is secondary to a tuberculous focus in some other part of the body, although that focus cannot always be demonstrated by clinical examination. The entrance of this disease into the urinary tract is at times evident in only one kidney. Sooner or later both kidneys become involved. If on cystoscopic study only one kidney is found to be infected, it is possible to cure the disease by nephrectomy on the diseased side. If the disease is bilateral, surgery is generally contraindicated. Seldom is renal tuberculosis cured by medical treatment, although symptoms may be improved and the progress of the disease checked. Intelligent handling of this condition requires, I believe, the services of a urologist who knows the limitations as well as the benefits of surgery, and recognizes the value of preoperative treatment. The services of the medical man in judging the condition of the patient's lungs and his power of resistance and in determining the opportune time for surgery, as well as in supervising the regimen, are likewise necessary.

Finally, mention must be made of a subject about which relatively little is known but which is sure to command an increasing amount of attention in the future. Hypertension caused by unilateral renal disease or ischemia is a fascinating subject, a few case reports are appearing which describe how patients with hypertension apparently due to this form of kidney disease have been improved or relieved by operation on the affected kidney. Most cases of hypertension do not, so far as we know, fall into the group which can be improved by renal surgery, yet anatomical and physiological studies of the kidneys in patients with hypertension may enable one to find the occasional patient who can be helped by urological surgery.

Only by maintaining an alert attitude toward all phases of renal disease can the urologist give patients and physicians the best advice in each individual problem.

sometimes intermittent pain in the kidney region or the upper quadrant of the abdomen, or the so-called pain along the course of the ureter, pain which may be due to renal, ureteral, abdominal or perhaps pelvic disease. Suppose that a carefully taken history, abdominal palpation, pelvic and rectal examinations and urine analysis fail to clinch the diagnosis. It is possible or probable that a kidney is the source of the trouble, it is also possible that the bowel is responsible. How should one proceed? In such a case, if the urine sediment under microscopic examination shows no evidence of blood or infection, I should again prefer a plain film of the kidney, ureter and bladder region, with intravenous pyelography, followed by a gastrointestinal series, barium enema or other studies, if necessary. If the gastrointestinal studies are done first, opaque masses can be found by x-ray, sometimes for a period of days afterward. This condition holds true even following catharsis and enemas, and ruins any chance of immediate urological study. The reverse does not hold true. Urological x-ray photography will not interfere with the making of abdominal studies on the following day. Therefore, when a differential diagnosis is considered, urological study should precede gastrointestinal study in order to save the patient time, as well as expense, if he is in a hospital. With obscure pain due to hydronephrosis, the intravenous pyelogram has an excellent chance of indicating the diagnosis. Retrograde pyelography, I believe, is preferable, however, in cases of obscure pain which show abnormalities in the urine sediment. Divided catheter specimens, split functions, and so forth, allow one to interpret the findings more accurately than can usually be done by intravenous pyelography.

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the cavity to be larger than before and revealed a bronchial fistula (Figs 1 and 2) \* On February 25, a flat film of the chest showed thickened pleura and very little fluid in the left chest. Injection of 4 cc. of lipiodol showed the pleural cavity and bronchial fistula to be smaller. On March 19, a 20-cc. injection of lipiodol showed the cavity to be larger and the fistula prominent. Treatment was continued, and the cavity eventually healed completely

*Comment* This case demonstrates how inconclusive flat x ray films of the chest may be in estimating the size of an empyema cavity. If lipiodol had not been used, the drainage tube might have been removed when the cavity held 12 cc. measured by irrigation. In addition, the bronchial fistula would not have been revealed

*Case 2* M. S., a 28-year-old woman, entered the hospital on January 18, 1937, or 4 weeks after the onset of pneumonia. On the 7th day left thoracentesis revealed thick, odorless, greenish pus containing Type 3 pneumococci. X ray of the chest was consistent with fluid in the left chest. The following day, under Cyclopropane anesthesia, a rib resection was performed and 250 cc. of pus was obtained. The cavity was irrigated with salt solution and then Dakin's solution. On March 1, the cavity held 4 cc. measured by irrigation and injection of lipiodol showed a very small pocket. The tube was therefore removed, and the wound healed by March 28. The patient remained well, and an x ray film taken on February 25, 1938, revealed a normal chest.

*Comment* This case is included because of the corroborative evidence given by the injection of lipiodol to the effect that the tube could be removed with impunity

*Case 3* E. B., a 37-year-old man, was admitted to the hospital on February 4, 1937, with a history of pneumonia

fluid in the right chest. On February 29, under Cyclopropane anesthesia, rib resection was performed and a large amount of pus was obtained. On March 29, injection of lipiodol showed a cavity measuring 4 by 7 cm. by x ray



Figure 4 Lateral View of Chest Shown in Figure 3  
This demonstrates the true extent of the sinus

On April 8, the cavity held 10 cc. measured by irrigation, and the tube was removed. The patient remained well until 7 months later, when the incision reopened and



Figure 3 Lipiodol Filling Showing a Residual Pocket

of 10 days duration. On February 22, thoracentesis yielded 800 cc. of thick, greenish pus, cultures showed Type 1 pneumococci. An x ray film was consistent with

In some cases lipiodol fillings have been outlined on the x ray plates in order to give sharp contrast.



Figure 5 Lipiodol Filling, with Obliteration of the Empyema Pocket

a draining sinus resulted. Injection of lipiodol showed a definite pocket, and a tube was inserted (Figs. 3 and 4). Three weeks later the tube was removed after injection of lipiodol revealed a very small pocket (Fig 5). The patient remained perfectly well.

## INJECTION OF LIPIODOL AS A GUIDE IN ESTIMATING THE HEALING OF ACUTE EMPYEMA CAVITIES\*

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**I**N a discussion of the treatment of acute empyema, Graham, Singer and Ballon<sup>1</sup> have stated that there are three cardinal principles maintenance of nutrition, drainage, but with careful avoidance of an open pneumothorax during the period of active pneumonia, and early sterilization and obliteration of the cavity. We propose to discuss the difficulties in determining the obliteration of an acute empyema cavity and to emphasize the importance of lipiodol in this determination

an empyema cavity by irrigation alone, or even by the interpretation of x-ray films of the chest, may be erroneous, and that the injection of lipiodol, before removal of the tube, is necessary in order to show the size, extent and location of the cavity. The 4 cases that follow have been selected to justify our contention.

*Case 1* B. M., a 38-year-old man, was admitted to the Beth Israel Hospital on November 15, 1937, or 7 weeks after the onset of pneumonia. Thoracentesis yielded thick, gray green, odorless pus, a smear showed a few polymorphonuclear leukocytes but no bacteria. Both aerobic and anaerobic cultures were negative. X-ray films at this time were consistent with fluid in the left chest. On



Figure 1. *Lipiodol Filling, Showing an Empyema Pocket and a Bronchial Fistula*

*There is lipiodol in the contralateral upper lobe*

We know that this obvious and logical procedure has been employed by some surgeons, but a careful perusal of the literature has revealed no general acceptance of it. On the other hand, many surgeons have removed the drainage tube from an acute empyema cavity when it measured 10 cc. or less on irrigation. It is also a known fact that a few acute empyema cavities thus measured have recurred with a residual pus pocket, and some have progressed to chronic empyema.

We shall demonstrate that the measurement of



Figure 2. *Lateral View of Chest Shown in Figure 1*

November 18, rib resection was performed under Cyclopropane anesthesia and 1000 cc. of pus was obtained. Two rubber tubes were inserted and the cavity was irrigated postoperatively, with salt solution administered for 2 days and Dakin's solution thereafter. The patient made an uneventful convalescence. On December 16, a flat film of the chest was interpreted as showing thickened pleura and a slight degree of pneumonitis in the left lung, with evidence of a small amount of fluid in the pleural cavity. The cavity held only 30 cc. on irrigation, but with lipiodol a large cavity was demonstrated. On January 4, an injection of 12 cc. of lipiodol still revealed a large cavity, although it was smaller than that noted previously. On January 21, a flat film of the chest revealed a small amount of fluid at the left base, other than this there was nothing worthy of note. Injection of 20 cc. of lipiodol showed

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*Comment* In this case the drainage tube was removed from the right pleural space on the first admission because the cavity held only 3 cc. measured by irrigation. No lipiodol had been injected at that time. Although several months elapsed before the recurrence of the empyema, it seems unlikely that this complication would have occurred if the cavity had been obliterated at the time of the first admission.

When the time approaches for the removal of the tube from the pleural space, as indicated by the general condition of the patient and the diminution of drainage from the pleural cavity, lipiodol should be introduced through the tube. We ordinarily use a 40 per cent solution. In large cavities, owing to the expense involved, we dilute the lipiodol with mineral oil, and have thus obtained satisfactory films. In introducing the lipiodol, excessive pressure should be avoided. The patient is placed with the affected side uppermost so that the lipiodol will flow in by gravity. In order to demonstrate the presence or absence of a bronchial fistula, the patient is instructed to close his mouth tightly, hold his nose firmly and take a deep breath.

The instillation of lipiodol is the only exact method for determining the size, shape and location of an empyema cavity. On numerous occasions we have been misled concerning the size of a cavity by the interpretation of flat films of the chest, and also by the simple introduction of salt solution. The quantitative measurements are often meaningless because the fluid content of the cavity is not evacuated completely before the introduction of the measuring fluid. Attempts have been made to empty these cavities before injection by postural drainage, and even by aspiration of the cavity fluid through a catheter, but without success. This explains the discrepancy between the size of the cavity as seen by x-ray after the instillation of lipiodol and the measurements by saline irrigation.

In one of our cases (Case 1) injection of lipiodol demonstrated the presence of an unexpected bronchial fistula. It had not been noted previously during the course of daily irrigations with salt solution.

Removal of the tube should take place only after the injection of lipiodol reveals a well-obliterated pleural space. For example, in Case 3 the tube was removed without further lipiodol checkup a week after injection of lipiodol had shown a fairly extensive cavity. This patient had an incompletely drained pleural space, even though it held only a few cubic centimeters of saline at the time of the removal of the tube. This case also tends to refute Ransohoff and Heiman's<sup>2</sup> contention that since lipiodol acts as an obliterating agent it is safe to remove the tube even in the presence of a large cavity.

The incidence of recurrent empyema should be reduced by a more general adoption of this procedure. Case 4 has a possible bearing on this point, the patient had a recurrence of empyema fifteen months after drainage, even though the flat x-ray films taken in the interim were negative. There was no instillation of lipiodol before removal of the tube. It seems reasonable to assume that if lipiodol had been used and had shown complete obliteration of the cavity at the time of the first discharge, the possibility of recurrence would have been extremely remote.

#### CONCLUSIONS

Flat films of the chest are often misleading in determining the size of the pleural space after drainage of an empyema cavity.

The amount of salt solution employed in measuring a cavity is usually much less than the actual size of the cavity.

X-ray films taken after the instillation of lipiodol are extremely accurate in determining the size, shape and position of the cavity and in ascertaining the proper time for removal of the drainage tube.

A more general adoption of this method as a routine procedure should lead to a lessened morbidity and a diminution in the incidence of chronic empyema.

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- 2 Ransohoff J. L. and Heiman J. D. The therapeutic value of lipiodol in empyema. *Surg. Gynec. & Obst.* 46:708-710 1928.

*Comment* This case shows the error of removing the tube when the cavity holds 10 cc. by irrigation, without corroboration of its size by injection of lipiodol

*Case 4* M F, a 10-year-old child, entered the hospital on February 18, 1935, or 3 weeks after the onset of broncho-

pneumonia. Thoracentesis on both the right and left sides revealed thick, odorless, greenish pus which was negative on culture but contained short-chained strepto-



Figure 8 *Lipiodol Filling, with Absence of a Pleural Pocket*

*This film was taken following rib resection and drainage*

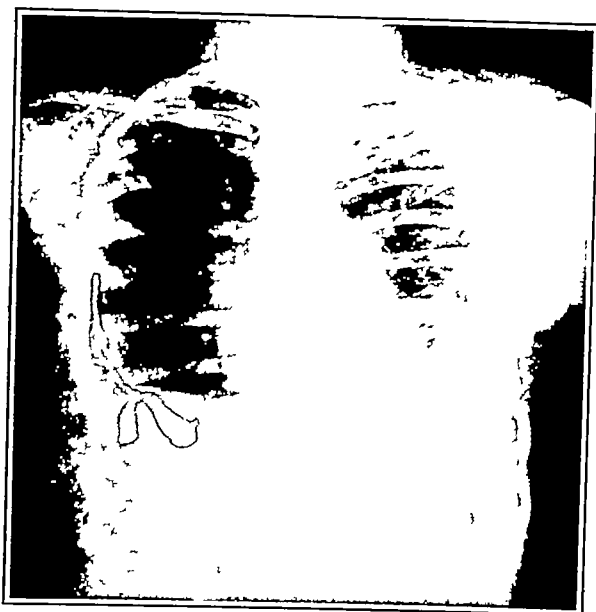


Figure 6 *Lipiodol Filling, Showing Recurrent Empyema Pocket*

pneumonia. Thoracentesis on both the right and left sides revealed thick, odorless, greenish pus which was negative on culture but contained short-chained strepto-

cocci on smear. Thoracotomy on both sides was performed, and both sides healed. On May 3, the right side was reopened and a tube was inserted. On May 17, the right pleural space held 3 cc. measured by irrigation and



Figure 7 *Lateral View of Chest Shown in Figure 6*

the tube was removed. On February 14, 1937, the patient was readmitted with malaise and pain in the right chest. An x ray film of the chest showed a dense shadow on the

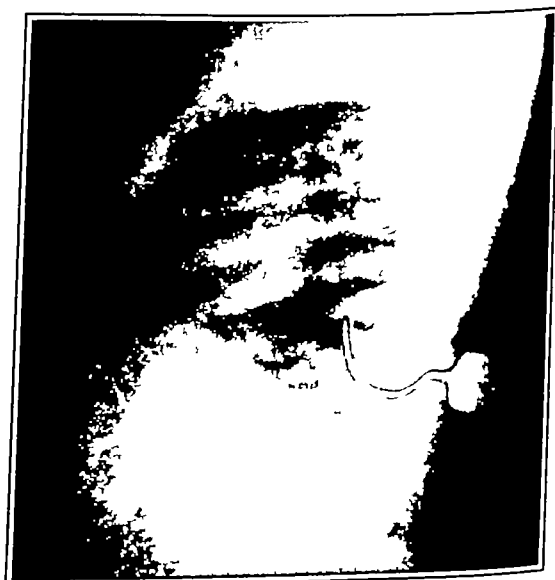


Figure 9 *Lateral View of Chest Shown in Figure 8*

(Figs 8 and 9) On September 27, an x ray film of the chest was negative, and the patient has remained asymptomatic.

these, as in all others, the degree of symptomatic peripheral recovery depends on the variety of tissue that has failed to fuse. Thus meningo- or encephalomyelocele has the least and the spina bifida occulta the most favorable outcome, regardless of the type of therapy

#### INFECTION

Infectious processes that involve the central nervous system might be supposed to be outside the realm of neurosurgery. Nevertheless, it is true that because they frequently occur as complications of otherwise uninfected conditions, a knowledge of their characteristics is necessary for the neurosurgeon

**Meningitis** Non-specific meningitis is still treated most successfully by as near an approach to constant lumbar drainage as is feasible, plus the administration of large amounts of fluid, preferably by mouth or, if that is not possible, by any other method. Constant lumbar drainage by either needles or indwelling ureteral catheters has not yet proved practical. Proved or suspected infections with *Streptococcus hemolyticus*,<sup>6</sup> the meningococcus,<sup>7</sup> the pneumococcus<sup>8</sup> and probably the influenza bacillus should be treated by sufficient sulfanilamide by mouth to insure promptly and to maintain constantly a 10 mg per cent or higher concentration of the drug in the blood at all times. Appropriate antiserums must also be used, and care taken to anticipate any toxic effect of the sulfanilamide by daily red and white blood-cell counts and the administration of sodium bicarbonate

Meningitis following trauma is found, according to Courville and Platner,<sup>9</sup> to vary from 2.3 to 10 per cent in various series of autopsies, their figure being 6. The figures were collected from groups which ranged from 432 cases for the lowest figure to 1261 for their own. My<sup>10</sup> figures, as obtained from 1203 hospitalized patients, gave an incidence of 0.4 per cent. If only the fatalities were considered the incidence rose to 2 per cent. It seems justifiable to conclude that treatment accorded the patients in the series with the high incidences might have been susceptible of improvement

**Brain abscess** This is a much-discussed problem so far as its treatment is concerned. I believe that the best evidence is to the effect that when the abscess is relatively young and heavily encapsulated, repeated tapping and inadequate drainage through a small rubber tube are equivalent to neglect. The preferred method should, if possible, be carried out in two stages. At the first stage, the bony opening is made, the abscess located and the meninges at the edge of the skull

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#### INJURIES TO THE CENTRAL NERVOUS SYSTEM

**Craniocerebral injuries** With only rare exceptions, it is now generally agreed that the preferred treatment of the fundamental non-operable type of craniocerebral injury is by lumbar decompression combined with judicious dehydration. Subtemporal decompression is practically never indicated for its decompressive effect only, although exploratory trephination is well established as a diagnostic requirement.<sup>10</sup> Of the operable group, it is becoming increasingly evident that the subdural hematoma is much commoner than has been supposed and that the final diagnosis can only be made by means of exploratory trephination. It is therefore greatly to be regretted that Kaump and

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## NEUROSURGERY

DONALD MUNRO, M.D.\*

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TO RECORD progress in neurosurgery is to measure progress in medicine in general. Specialties are limited in name only, and then only because the specialist has sacrificed his general medical knowledge in favor of superknowledge about one single subject. With this superknowledge goes ignorance, and the specialist becomes a specialist not by virtue of what he knows but rather by virtue of what he knows he does not know. It is therefore the progress that is made in the fields outside, quite as much as the changes that take place within, that affect the advancement of a specialty. A discussion of the year-by-year alterations that have taken place within the field of neurosurgery cannot be a measure of progress but is rather a critique of methods and ideas.

CONGENITAL STATES AND THOSE ARISING  
AT OF JUST AFTER BIRTH

*Cyanosis of the newborn* In its neurological aspect the conception, now well established, that cyanosis within physiologic limits is the normal condition of the newborn, is second only in importance to the establishment of the fact that asphyxia, which is not cyanosis but pathologic anoxemia, is the fundamental factor in the determination of the degree of acute brain injury.<sup>1</sup> Treatment based on this concept determines, at the last analysis, the amount of future invalidism. If carried to its logical conclusion, it is apparent that lumbar decompression, supplemented by diagnostic subdural puncture and, if necessary, by trans-temporal trephination and appropriate dehydration, is the only acceptable treatment for intracranial hemorrhage of the newborn. The possibility of an associated hemorrhagic diathesis is cared for by the routine intravenous administration of parental whole blood in any vein except the superior sagittal sinus.

*Porencephaly* This condition in which there occurs "a defect in the cerebral or cerebellar structure appearing as a cystlike cavity communicating with the ventricles or separated from them by only a thin layer of brain tissue, covered on the outside by the pia arachnoid and filled with a clear colorless fluid,"<sup>2</sup> may be the result of birth injury, is frequently associated with convulsive seizures

later in life and has commonly been regarded as not amenable to treatment from the point of view of relief of symptoms. My experience with 2 cases and Patten's<sup>3</sup> similar experience makes the outlook for these patients much more hopeful. There is no doubt but that in view of this evidence, anyone who is proved to have a porencephalic cyst should have a craniotomy and a destruction of the surface of the cyst cavity. The diagnosis is usually made by an encephalogram. Both examination and treatment should be instituted early in order to avoid the excessive cortical atrophy that otherwise develops.

*Communicating hydrocephalus* Dandy<sup>4</sup> has again drawn the attention of the medical public to Putnam's work in the treatment of communicating hydrocephalus. The latter's therapy called for destruction of the choroid plexus in the two lateral ventricles and possibly also in the lateral recesses of the fourth ventricle. It is the only method that offers any hope for these invalids, but too much should not be expected of it.

*Athetosis* Section of the extrapyramidal tracts in the spinal cord as a means of relieving athetosis<sup>5</sup> occupies a definite place in our armamentarium against this dreadful form of invalidism. While not yet curative, there is reason to hope that, with early diagnosis and treatment, more may be accomplished than mere relief of invalidism. The procedure is highly technical and should be undertaken only by one well trained in neurosurgery.

*Spina bifida* Although spina bifidas may be successfully closed, a well baby does not necessarily follow. A high percentage of these children develop an acute hydrocephalus which vitiates the surgeon's otherwise successful work. Penfield and Coburn<sup>6</sup> have explained why this occurs in certain cases and offered suggestions for its prevention. They find the cause in the Arnold-Chiari malformation and the cure in a cerebellar and high cervical laminectomy, to be followed by repair of the spina bifida defect, no matter where its level. Other clinics, notably those in London, have used this same method. Their unpublished reports are favorable. The reference should be consulted for details. This malformation applies chiefly to those spina bifidas that have large sacs, even though in

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trephine holes on each side of the midline in the frontal bone as recommended by Cohn can be used when greater pull is desired and more particularly when the patient is able to stand the manipulation necessarily associated with their application. Plaster-of-Paris cuirasses in cervical cord injuries are contraindicated. This is not so when only the bony structures are involved. Castex casts,<sup>27</sup> if the expense can be borne and if they are properly applied, may prove to be a useful adjunct in the therapy of this condition in elderly people with a minimum (relative) of cervical cord injury. Extension of other parts of the abnormally flexed spinal column can, in the presence of associated cord injury, be carried out with safety to the patient during his recumbent period by placing a roll of blankets opposite the kyphos but beneath the mattress and on top of bed boards. The degree of extension can be varied by changing the size of the blanket-roll.

A further development in the problem of ruptured intervertebral disk has been introduced by Naffziger et al.<sup>28</sup> They report that thickening of the ligamentum flavum with pressure locally on and through the dura may occur alone or in association with a ruptured disk. The symptoms and diagnostic criteria are the same as those necessary to justify a laminectomy in search of an extruded nucleus pulposus.

#### TUMORS OF THE CENTRAL NERVOUS SYSTEM

*Intracranial tumors* Neurosurgeons have always recognized the need for some form of treatment other than surgery in dealing with certain of the more malignant and infiltrative types of brain tumor. Davis and Weil<sup>29</sup> report on the effect of both x-ray and radium therapy on intracranial gliomas and conclude that it is impossible to tell as yet what effect either method has. Frazier et al.<sup>30</sup> are somewhat more specific. In their experience they conclude that medulloblastomas are radio sensitive but are commonly under-radiated from the standpoint of quantity, that glioblastomas are little if at all affected by radiation, that certain astrocytomas are radio-sensitive especially in the group whose cells are not fully matured, that ependymomas showed marked radio sensitivity and that oligodendrogliomas are completely resistant to radiation. From the same clinic Carpenter et al.<sup>31</sup> write that attempts at the radical removal of tumors of the hypophyseal stalk carry an unjustifiably high mortality with no commensurate certainty of complete excision. They strongly advise repeated evacuation of the cystic portion and radiation of the solid remaining structure and assert that in this way intervals between necessary aspirations have been lengthened and

the rapidity of recurrence of symptoms slowed up. Carcinomatous metastases to the brain are usually considered to be inoperable once the diagnosis has been confirmed by histological examination of a biopsied specimen. This attitude arises out of the belief that the metastases are usually multiple. German,<sup>32</sup> however, in 14 cases of metastatic carcinoma of the brain found only 1 case with multiple tumors. In so far as it goes, this relation is significant, but as applied to the individual case, I doubt whether the many other conflicting factors justify paying undue attention to it.

Olivecrona<sup>33</sup> emphasizes the importance of radical surgery in the cellular types of cerebral vascular tumors. He points out, as others have, that these tumors are benign and usually favorably placed for excision. It should not be overlooked, however, that identification and therefore prognosis and the type of surgery depend on the histological identification of the tumor and that, conversely, diagnosis and therapy based on symptoms and signs that do not include this datum are worse than useless.

*Intraspinal tumors* Intraspinal tumors in children are not commonly diagnosed, usually because the possibility of the presence of such a condition early in life is not considered. Ingraham<sup>34</sup> emphasizes the obvious futility of such an attitude and by implication justifies the statement, which cannot be emphasized too strongly, that diagnosis at this age is no more difficult than that at any other time of life. Half his cases, as was to be expected, had tumors that arose from developmental cell inclusions, but a less predictable finding was the high percentage of meningiomas and rather advanced gliomas. Adson<sup>35</sup> summarizes the present-day knowledge in regard to intraspinal tumors in general. Again early diagnosis is of importance in regard to the outcome. The surgical mortality is low, — 4 per cent, — and the prognosis hopeful, since 85 per cent of these tumors are benign. The one depressing part of the picture is found in the intramedullary varieties. Even with two-stage operations that permit auto-extrusion of the tumor after vertical section of the cord, and even in the face of a prolonged life expectancy, the relief of invalidism and restoration to economic self-support are not common in this group.

#### PERIPHERAL NERVOUS SYSTEM

*The brachial plexus* Neuritis of the brachial plexus which is mechanical in origin or, as more commonly phrased, the scalene syndrome has come to be recognized as an important cause of pain, atrophy, disability and circulatory changes in the

Love<sup>20</sup> should have seen fit to publish their fanciful theory about the formation of subdural hematomas. It is inexcusable at this time to publicize a revolutionary theory without overwhelming evidence in its favor and large experience to back it up. This is especially true when it is diametrically opposed to one that is already universally accepted and well established on abundant evidence. Their series of 13 cases of traumatic subdural hematomas, which has been stretched to 30 by the inclusion of syphilitics and patients with blood dyscrasias, is not enough to justify their conclusions.

The furor relative to the dangers of using hypertonic glucose solutions intravenously and to the corresponding necessity of substituting hypertonic sucrose solutions therefor has died, and glucose continues to be used. As has been recognized since the time of Aesculapius, "the study of mankind is man" and even with our modern facilities, conclusions based on animal experiments do not necessarily apply to the higher forms of life.

A study of craniocerebral injuries as seen among those students who participate in sports in a large university has been started.<sup>21</sup> So far, it has been demonstrated, at least in football players, that the question of water balance is the most important factor in the treatment of those who have received head injuries. Concussion<sup>10</sup> used in the self-limited pathological rather than in the loose lay sense is the usual lesion, with the prolongation of symptoms after recovery of consciousness being due to the associated toxic dehydration.

Puech and Krebs<sup>22</sup> make a valuable contribution to a better understanding of the post-traumatic syndrome. Their recognition of the frequency of the pocketing or laking of cerebrospinal fluid in thickened and scarred arachnoid tissue as a cause of so-called post-traumatic cerebral symptoms should go far toward helping to bring order out of the present chaos that afflicts this problem. Others have called attention to the similar importance of recognizing fluid subdural hematomas as another equally prolific organic source for these symptoms.

An unusual cause of traumatic cerebral edema is electric shock. It is important, however, because of its late effects and its relation to industry. As might be expected, the edema is associated with venous stasis, thrombosis, perivascular hemorrhages and cell death, with perivascular demyelination and incomplete necrosis. Alexander<sup>23</sup> in a well-documented paper produces evidence to show that electric shock causes cardiac inhibition which leads to anoxia and suffocation of the brain tissue. It may be tentatively concluded, in the light of analogous pathology in other forms of cranio-

cerebral injury, that the non-fatal cases can be expected to show varying degrees of interference with peripheral function. Industrial surgeons generally should not fail to consult this article.

*Injuries to the spinal cord* It is now well known that the first effect of an injury to the spinal cord is the production of spinal shock. Spinal shock throws out of gear, in a completely irregular fashion, all reflex activity below the level of the cord injury. The bladder, being fundamentally a reflex organ, is included in this disruption. Residual urine collects and becomes infected. The bacteria spread, involve the bladder, ureter and kidney and set up a major toxic infection, which in its turn brings back or continues the spinal shock with its changes. If untreated or treated by an indwelling catheter, no catheterization, intermittent *crédé* of the bladder or suprapubic drainage, the incidence of infection in the genitourinary tract at the discharge of such patients from the hospital is 72 per cent. Treated by tidal drainage from the very start and with the infection limited to the bladder and rendered relatively innocuous because residual urine is not allowed to collect, the incidence of the same infection is only 14 per cent.<sup>24</sup> This difference is re-emphasized because a recent paper written by Sir J. Thomson-Walker<sup>25</sup> has resurrected the conclusions reached from a study of war wounds without the aid of and indeed before the development of tidal drainage. As applied to civil life, his conclusions are hardly significant in so far as the care and transportation of the wounded from the field to the base hospital goes, but his ideas relative to treatment instituted after the base hospital is reached may well be accepted as applicable to injured civilians if the reader has had no experience of his own to guide him. Attention is called to this article only to condemn the conclusions published therein as obsolete.

Surgical treatment of injuries of the spinal cord depends on the location of the cord damage and the presence or absence of a cerebrospinal fluid block. In cervical injuries, decompressive laminectomy—indicated under like circumstances in the lumbar and dorsal areas—is contraindicated even in the presence of a block. Traction, however, must be applied to the head. My experience leads me to believe that the most universally useful method is through a bridle which pulls from beneath the chin and occiput over an outrigger and which carries not more than 5 pounds of weight. The best of these are homemade of flannel bandage. Traction applied to the skull through tongs, the latest model of which is Barton's,<sup>26</sup> or by piano wire passed through adjoining

above. The article should be read by all interested in this problem. In particular, it should be pondered by those who find themselves intrigued by the thought that this disease can be treated by electrocoagulation of the gasserian ganglion, as proposed by Adler<sup>39</sup> from the Sauerbruch clinic. The latter reports 25 cases, with 1 fatal case due to either meningitis or air embolus, 2 cases of herpes zoster and 1 case with an enlarging ulcer of the ala nasi. The procedure is done without anesthesia through the foramen ovale and is said to spare the fibers of the first division. Mack<sup>40</sup> also recommends this procedure, although his series has only 23 cases and his ratio of complications is much higher than that of Adler. Kirschner states in the discussion of Mack's paper that electrocoagulation is now the method of choice in dealing with trigeminal neuralgia and cites 380 cases, with 87 per cent completely healed, however, these included a case of injury to the optic nerve and several cases of meningitis, and recurrence after three years occurred in 20 per cent. Grant's<sup>38</sup> comparative figures for the cases treated by incomplete section of the sensory root are 590 cases, with a recurrence rate of 7 per cent, 4 per cent of the cases had keratitis. In his larger series of 949 cases, the mortality was 1.36 per cent, meningitis having occurred twice.

*Ménière's syndrome* Ménière's disease or what may perhaps be spoken of as primary neuralgia of the vestibular nerve is still the subject of dispute in regard to therapy. Much of the confusion and most of the conflicting results that have arisen out of the various methods adopted to relieve the attacks of vertigo can be found in the failure to differentiate aural vertigo and Ménière's disease. The symptoms may be the same, but with aural vertigo the fundamental cause that initiates the attacks of explosive dizziness can be demonstrated. When this is corrected, the attacks usually cease. In this category fall the patients with foci of infection, with chronic ear disease and with collapse of the Eustachian tubes and those who suffer from dietary indiscretions and the like. Individuals who have similar vertiginous attacks but in whom it is impossible to demonstrate any known cause or in whom potential causes have been demonstrated and corrected without relief have Ménière's disease. Thus, as our knowledge of the cause of labyrinthitis or vestibular-nerve neuralgia increases, the number of patients with true Ménière's disease decreases and the number with aural vertigo increases. Most cases of aural vertigo can be relieved when the cause is corrected. No cases of true Ménière's disease can be relieved in this way because the cause is not demonstrable. Aural vertigo that still persists because the underlying cause

cannot be done away with is relieved by section of the vestibular nerve in about 8 out of 10 cases. The vertigo of Ménière's disease is relieved in every instance by section of the vestibular nerve on the side of the deafness and tinnitus, the tinnitus may be unaffected and the deafness either improves or remains as before. Temporary relief in many cases of true Ménière's disease can be obtained by the administration of potassium or ammonium chloride and the total elimination of sodium chloride from the diet. Potassium chloride is preferable and has a sounder basis for administration than has ammonium chloride. Permanent relief can be obtained by this treatment in a few of the same group of cases. The effect of this regime on aural vertigo is not known. In this connection, I have noted the occurrence of avitaminosis with the production of preclinical scurvy as the result of artificial limitation of diet. It led to a hemorrhage into the fallopian canal, with a peripheral facial palsy, that took place five days after section of the nerve. The paralysis cleared up completely in two weeks, coincidentally with the administration of large quantities of crystalline vitamin C.

In line with the attempt to demonstrate additional fundamental causes for Ménière's syndrome and thus to increase the group of aural vertigos, Hallpike and Cairns<sup>41</sup> have contributed a study of the histologic changes in the temporal bones of 2 of the former group of patients. They claim that the changes found are suggestive and are based on "a gross distention of the endolymph system together with degenerative changes in the sensory elements." The paper is important, because this is believed to be the first histological study that has ever been carried out in such patients. It should be noted, however, that the deaths occurred, and therefore the studies were made, one and three days respectively after the vestibular nerves had been divided.

#### CLINICAL ENTITIES

*Pain* Intractable pain, the cause of which cannot be corrected, lends itself to treatment by some form of denervation of the pain-bearing region. Hodgson<sup>42</sup> has reviewed the various methods at our disposal when the cause is cancer. They are chordotomy, section of the cranial nerves within the cranium, posterior rhizotomy, injection of peripheral nerves with alcohol and injection of alcohol into the spinal subarachnoid space. White<sup>43</sup> has suggested a useful modification of the standard method of carrying out the last procedure. By elevation of the hips to a higher level than that of the head and injection through the fourth lumbar space with the patient lying on his abdomen, he has demonstrated that the injected alcohol, be-

arm Naffziger and Grant<sup>36</sup> and Spurling and Bradford<sup>37</sup> have emphasized the variability of the symptoms, the fundamental causal background which is found in the relation between the shoulder girdle and the thoracic cage, the diagnostic significance of the effects produced by altering the position of the arm, and the lack of necessity of demonstrating the presence or absence of a cervical rib as one of the findings. On the other hand, all are agreed that the distortion of the brachial plexus by the interlaced or overlying scalenus anticus muscle is the significant factor in the production of the symptoms. Therapy based on this premise is successful and gives relief after varying periods of time from a few hours up to eight months. In the mild cases, it may be enough for the patient to practice exercises that strengthen the muscles which elevate the shoulder girdle, with perhaps additional mechanical support for the arm during the early stages. More severe cases must seek relief through surgery, however. In these latter, the muscle is cut away from its insertion into the first rib. The myotomy must be complete and must include all the muscle as well as its sheath. The muscle is usually hypertrophied and fibrosed and frequently has a sharp fibrous edge. If a cervical rib is present and is long enough to extend forward beneath the lower cord of the plexus, the rib must be excised. In view of the multiplicity of subjective symptoms and the paucity of objective signs, it is well to be sure that the scalene syndrome is not the cause of pain about the shoulder or in the arm, especially when, as Naffziger and Grant<sup>36</sup> put it "the signs all point to a peripheral neuritis of the brachial plexus with striking relation to posture." If this diagnosis can be made, relief through surgery will be striking. The possibility and, if the history warrants, the probability of a traumatic origin for an acute scalene syndrome cannot be denied.

In this connection, it is well to emphasize the inefficiency of operative therapy in the treatment of direct trauma to the brachial plexus. It is only rarely possible to suture any torn elements of the plexus with sufficient accuracy to get any greater degree of axonal regrowth than would develop without suture. This is particularly true if the tear is in the roots or the primary cords. On the other hand, if interruption is from a physiological rather than an anatomical cause, operative insult will only make bad matters worse. Compression by a supraclavicular hematoma, which is always associated with and often the chief cause of the interruption, is not corrected by the substitution of an operative scar for the lesion caused by the organization of the blood clot. On this basis, and because peripheral evidence of axonal

regeneration may not be demonstrable for six months after the injury, it is preferable to place the paralyzed arm in the modified Statue-of-Liberty position, with abduction at the shoulder, 90 degrees of flexion at the elbow and full supination of the hand, as soon after the injury as is possible, and to keep it there until the paralyzed muscles have been re-energized, or until six full months have passed without any evidence of decrease in the peripheral sensory or motor paralysis. While the supraclavicular hematoma is fresh, it should be treated by x-ray to diminish the amount and soften the tissue of the scar. During the period of splinting and afterward, the muscles must be maintained in a state of normal tonus and size by constant massage, active and passive motion and electrical stimulation. Under this regime, it is scarcely ever necessary to interfere surgically with damaged brachial plexuses for the purpose of giving the patient the greatest possible amount of recovery from his disability.

#### CRANIAL NERVES

*Trigeminal neuralgia* In this country, the treatment of trigeminal neuralgia (tic douloureux) is either operative, with permanent relief, or by alcohol injection or inhalation of trichlorethylene, with temporary relief. The modern method of differential section of the sensory root by which the sensation and moisture of the cornea are kept intact has robbed the operation of practically all danger to the eye, and a better understanding of the danger of wide lifting of the basilar dura, with elimination of damage to the greater petrosal nerve and vein, has seconded that effect and in addition eliminated the postoperative facial paralysis. Furthermore, although the relief has been as widespread and permanent as with total section, the anesthetic area has been diminished in extent and the resultant disability largely done away with. An occasional case still is bothered with postoperative paresthesias, but this is less likely to occur if the operation is reserved for the cases with classical tic. The diagnosis is limited in this way to the individual who has attacks of pain interspersed with free intervals, who has the pain strictly limited to one side of the midline of the face and, above all, who can be shown to have a constant "trigger point," stimulation of which produces in every instance the typical attack and nothing else. The usual method of approach is still by way of the temporal fossa, and this in spite of Dandy's enthusiasm for the route through the posterior fossa. Grant<sup>38</sup> has reviewed 949 cases of this condition from the late Dr. Charles H. Frazier's clinic. Analysis of this group demonstrated essentially the data outlined

amenable to extensive diagnostic neurosurgical procedures previous to craniotomy or in which the neurologic signs are so widespread as to defy analysis, the study of the electroencephalographic tracings has given correct localizing information in a very high percentage. The technic still needs some refinement to make it more universally applicable, but the process is too important and helpful to justify depriving the patient and his surgeon of its aid on that account.

**Thorotrast** The use of Thorotrast as a diagnostic aid has been widely advocated in the European literature even to the absurd extreme of employing it in the neurological diagnosis of head injuries, as recommended by Loehr<sup>64</sup>. It is therefore refreshing to come upon a clear-reasoned paper dealing with the use of this radio-active substance from a rationalistic rather than a special-pleading point of view. In such an article, Stuck and Reeves<sup>65</sup> point out in no uncertain terms that the dangers attendant on its use are far too great to justify its continuance as a diagnostic agent. Those proposing to employ the material in this way should read the paper in detail and with due consideration for its contents. Additional reason against its universal use is found in its inaccuracy. Campbell, Alexander and Putnam<sup>61</sup> in their study of the vascular pattern in various lesions of the human central nervous system point out among other things that "the alterations of the vascular pattern in disease are non-specific reactions and are to a large measure independent of the etiology, they are similar in many conditions, such as primary vascular disease, trauma, inflammatory disease and poisoning."

#### ANESTHESIA

Unfortunately, some form of anesthesia is necessary if one is to do neurosurgery. By-effects, especially if bad, of usual anesthetics come properly within the review of the neurosurgeon. Although nitrous oxide is not commonly used in neurosurgery, no surgeon can afford to overlook the evidence accumulated during the year to the effect that inhalation of this gas may cause far-reaching and permanent major injury to the brain. Stewart<sup>38</sup> emphasizes the lethal effect of the associated asphyxia, and Courville<sup>57</sup> describes the pathologic changes found in the cerebral gray matter of patients who had been anesthetized by this method. O'Brien and Steegmann<sup>38</sup> also describe degeneration of the brain under the same circumstances. Cyclopropane has also been described<sup>59</sup> as the cause of postanesthetic encephalopathy. Idiosyncrasy to novocain has been frequently reported, but it occurs so rarely that the individual surgeon has little if any personal ex-

perience in the matter. Gilman's<sup>60</sup> paper on the treatment of dangerous reactions to this drug is timely. He describes three types of dangerous reactions. The first is an intoxication for which barbiturates are the antidote, being more effective in the form of sodium pentobarbital and when used as a prophylactic. The second type of reaction presents signs referable to collapse of the circulatory system with a variation from the mildest type, which is relieved by lowering the patient's head, to death from sudden circulatory failure. The difficulty in this group is thought to be due to inadvertent intravenous injection of the novocain solution. Treatment is unsatisfactory. The third type is allergic in nature, and the symptoms vary from a mild urticarial type of skin response, an example of which I have recently seen, to sudden death after injection of as small a quantity as 1 cc of a 2 per cent solution. No treatment is known, but the addition of adrenalin to the novocain solution, especially when large amounts are to be used in infiltration anesthesia, is undoubtedly a useful prophylactic procedure and one that should be adopted universally.

#### OPERATIVE TECHNIQUE

The importance of fluid metabolism and the extraordinary variations that may take place in the fluid balance of the body from causes that are usually either overlooked or ignored is emphasized in a paper by White et al<sup>63</sup> on the loss of blood during neurosurgical operations. They point out that this loss commonly reached figures that exceeded 1000 cc and which are dangerously close to the critical margin of 1200 cc, the loss of which will throw the patient into surgical shock. Even the smaller loss is tolerated only because it has leaked away slowly over a number of hours. When it is remembered that there is an additional loss of fluid from the skin and lungs, which in a neurosurgical procedure may reach another 1000 cc or more, it becomes apparent that preparations for the intravenous administration of fluids during operation and for blood transfusions at any time are essential in this kind of surgery.

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cause of its specific gravity, floats to the highest point of the spinal subarachnoid space, in this case the region of the foramina of exit of the third to fifth sacral nerves. Because of the position, the effect is exerted bilaterally, and peripheral anesthesia and hypesthesia is complete and widespread. He advocates it as a substitute for chordotomy in poor-risk patients whose life expectancy is short and advises that the patient be prepared to face constant drainage of the urinary bladder, provided that he has not been already condemned to this arrangement.

Pain in the face provides one of the most difficult fields for diagnosis and treatment. This is particularly true when the type, distribution and historical sequences of the development of the pain do not conform to typical groupings of disease. Atypical pain has been shown to be due to malocclusion of the jaws, enlarged nasal turbinates, functional abnormalities of the sympathetic nervous system and numerous other causes. Glaser and Beerman<sup>62</sup> have analyzed 200 such cases in a well-documented article. They call attention to the often overlooked points that atypical facial pain is constant and not intermittent like true trigeminal neuralgia, that it is usually felt in the area supplied by the facial or external maxillary artery, that it is usually described as deep-seated, burning and throbbing, that women are affected three times more often than are men and that sympathetic phenomena are present in half the cases. Atypical facial neuralgia must be differentiated from trigeminal, glossopharyngeal and superior laryngeal neuralgias, all of which are paroxysmal in type.

While not strictly a surgical procedure, attention should be called to the use of snake venom as an analgesic in those patients whose pain would otherwise force surgery upon them. Macht<sup>44</sup> has reported 70 per cent of good results in the treatment of patients with various painful conditions. He used cobra venom. More limited experience with the same material in the Neurological Unit of the Boston City Hospital tends to confirm his results. The venom comes in ampules, and ten of them constitute one course of treatment.

*High blood pressure* Investigation in the rationale and efficiency of surgical treatment for essential vascular hypertension waxes apace. One can find support for almost any claim, either pro or con, in the flood of papers that have swamped the surgical literature in the past year. Good summaries with perhaps a slight surgical bias have been published by Davis and Barker<sup>45</sup> and by Martin.<sup>46</sup> Leriche<sup>47</sup> may be said to represent the foreign point of view and Page<sup>48</sup> the medical aspects. The best fundamental work is undoubtedly

that done by Heymans.<sup>49, 50</sup> There seems to be a general agreement that in a patient who has a labile blood pressure which is high while active and which falls when he remains in bed and who has symptoms severe enough to make him willing to undergo a major surgical procedure with no assurance that it will give him relief, any one of several operations will give a high percentage of symptomatic cure for an unknown time. As a sidelight on this, there can be no doubt but that the definition of what constitutes normal blood pressure and essential and malignant hypertension is a purely individual one with its maker. Furthermore, there are almost as many surgical methods of attack as there are schools of attackers while, at the same time, there is a dearth of adequate long-time follow-up on cases, no matter how treated. In short, it appears that the surgery of essential or malignant hypertension rests today on the questionable groundwork of confused diagnostic criteria, a multiplicity of methods, inadequate observation, and significant success only in mild cases. Such surgery can only be described as experimental, and patients should be operated on only with that understanding.

*Carotid-sinus syndrome* The occurrence of certain sudden fainting attacks in patients who are otherwise well has been found to be due to an abnormal response on the part of one of the carotid sinuses. The onset of the attack can often be traced to pressure over the bifurcation of the artery. This may have been produced by turning the head, by the pressure of the pillow or an arm against the neck during sleep, the wearing of a tight collar, and the like. Most of these attacks can be controlled by the administration of appropriate drugs. There is, however, a small residue that have to have surgery. The surgery takes the form of excision of the offending sinus and its nerves by denervating the carotid bifurcation and the adjoining 2 or 3 cm of the three arteries that make it up. Failure to recognize the diagnostic and therapeutic possibilities of this condition has obvious implications. In line with this general problem, Heymans<sup>51</sup> has considered the more fundamental aspects of the condition and Robinson<sup>52</sup> has suggested that amphetamine (Benzedrine) sulfate may be of use as an adjunct to ephedrine in the non-surgical depressor type of hyperactive carotid-sinus reflex.

#### DIAGNOSIS

*Electrotechnic* Although mentioned in last year's review, the importance of electroencephalograms as diagnostic aids in the localization of brain tumors justifies citing again the work of Williams and Gibbs.<sup>53</sup> In cases that for various reasons are not



CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25091

## PRESENTATION OF CASE

An eleven-year-old girl was admitted complaining of nervousness, headaches, vomiting and convulsions.

The patient was well and active, though inclined to be nervous, until one year prior to entry when almost daily attacks of headache began. These were moderately severe, always located in, behind or just about the right eye. They were occasionally associated with vomiting, but usually disappeared quickly, never interrupting play for more than five minutes. A gradual loss of weight began simultaneously with the onset of the headaches. Nine months before entry, while rollerskating, she had had a very severe right frontal headache accompanied by "pain in the stomach" and vomiting. She was put to bed, but the headache continued, preventing sleep. On the fourth day an "attack" ensued, the arms becoming flexed and the legs extended, without twitchings, convulsions or incontinence. She was conscious, talked normally and cried during the attack. Her physician sent her to an outside hospital where the attack was said to have stopped after a half hour.

Physical examination then showed a sallow, undernourished girl, apparently quite ill, complaining of severe frontal headache. The right biceps reflex was weak, the left, absent. The abdominal and leg reflexes were equal and active. There was no clonus, and no plantar response. A Mantoux test was slightly positive, but an x-ray film of the chest was negative. After two weeks in the hospital, having received "little white pills," ice packs and a diet which caused her to gain weight, she returned to school.

Her headaches continued to occur five or six times weekly, and she vomited three or four times weekly, though her appetite was good and her weight remained stationary. She became increasingly nervous, and her color at times seemed somewhat yellow and dark. The urine and stools remained normal. Eight days before admission the patient lay on a sofa, complained of headache and stated that she could not see, she then talked irrationally and recognized no one. Again she became stiffened and paralyzed, staring straight ahead.

There were no convulsive movements or incontinence. The attack lasted half an hour, following which she regained consciousness but was drowsy. She slept most of the succeeding three days, although she could be aroused. During the four days before entry she was very weak, staggered from side to side and vomited about once daily. During the year she had had urinary frequency, urgency and nocturia two to three times weekly. She was the ninth of twelve children, but her siblings were living and well. Her birth was normal, as was her postnatal development. Her father had typical migraine headaches, which were hemispherical and associated with nausea and vomiting.

Physical examination showed a well-oriented, intelligent, thin girl. The skin appeared tanned. A downy lanugo type of hair was present over the lower neck and spine. There was no breast development, but the genitalia were well developed and the pubic hair appeared normal. The general physical examination was negative. The blood pressure was 96 systolic, 70 diastolic. Neurological examination showed the eye muscles to be normal. The fundi showed obliteration of the disk margins, with three diopters of choking on the left, two on the right. There were flame-shaped hemorrhages along the nasal border of the left disk. Vision was 20/20 bilaterally with the patient's glasses. The visual fields were normal except for slight enlargement of the blind spots. There was minimal rotary nystagmus on looking to the right. The gait was slightly unsteady, with staggering on turning quickly. There was very slight swaying in the Romberg position. There was slight asynergy on the finger-to-nose test. The deep reflexes were essentially normal except that the knee jerks were slightly more active on the right on one examination. The Babinski was negative on the right, on the left it was equivocal on one occasion, positive on another, negative on another. Sensory examination was negative.

The temperature was 98°F, the pulse 58, and the respirations 19.

Examination of the urine showed a specific gravity of 1.020 and epithelial cells, debris and an occasional pus cell in the sediment. The blood showed a red-cell count of 4,500,000, 100 per cent hemoglobin, and a white-cell count of 10,500 with 60 per cent polymorphonuclears. A blood Hinton test was negative. A 1:1000 tuberculin test was negative. An electroencephalogram showed slow waves on all leads but indicated a definite focus in the right frontal area. The findings were consistent with a deep lesion causing increased intracranial pressure and hydrocephalus although

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ventricles, and headache By pressure or invasion of the pituitary gland and hypothalamus, endocrine and vegetative functions could be altered I see nothing in the history or examination to suggest a lesion in the frontal, parietal, temporal or occipital lobes

The results of the air studies, both by ventricular and lumbar routes, may be summarized as indicating a block in fluid passage from the lateral ventricles, with their consequent dilatation It is suggested that a mass occupies the region of the third ventricle and also obstructs the basal cisternae That this tumor did not take origin within the third ventricle is proved by the lack of separation or of deformation of the lateral ventricles

We must therefore come to the conclusion that a tumor of considerable size occupies the territory above the sella displacing or invading the third ventricle Such suprasellar tumors occur in children, as in adults, and, although rare, are apt to fall into the group of craniopharyngiomas

DR JAMES R LINGLEY The plain films show increased convolucional markings, and the sella turcica, although it is not enlarged, is deformed The clinoids are pushed downward, and the sella is flattened The anterior clinoids are sharpened, and the posterior ones are markedly eroded However, the signs in the sella can be secondary to pressure, the result of tumor anywhere in the skull The pineal body is very finely calcified, and by measurement it was slightly posterior to its normal position Usually that means a tumor anterior to the pineal body In the ventriculogram, the lateral ventricles, as you see, are markedly dilated and there is complete absence of air in the third ventricle, indicating a block distal to the foramen of Monro After lumbar injection of air you can see air in the cervical canal. It passes anterior to the pons, fills the posterior portion of the cisterna interpeduncularis and then stops There is a block at the posterior margin of the sella We were hoping that the air by the lumbar route would enter the fourth ventricle and definitely rule out tumor below the tentorium The fact that it did not fill is not very good evidence in favor of a cerebellar tumor, however, as it occasionally does not fill in the normal person

DR AYER Was there an anteroposterior view to show dislocation of the ventricle? I assumed there was not

DR LINGLEY It shows marked symmetrical dilatation of the lateral ventricles, without deformity, and absence of filling of the third ventricle

DR TRACY B MALLORY Would anyone like to criticize or disagree with Dr Ayer's diagnosis?

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little bolder and suggest an even rarer lesion—a colloid cyst of the third ventricle. The absence of separation of the lateral ventricles may be against this, but the history is suggestive We have a year's history of intermittent daily headaches of short duration, strongly suggesting an intermittent cause such as a pedunculated tumor This is supported by the normal visual acuity which shows that papilledema was of recent development If we suppose the tumor originated rather to the right side we could explain the fact that the early headaches were largely right-sided

DR AYER I considered that, but this x-ray film which we have seen showing no evidence of separation of the lateral ventricles is strong evidence against it.

DR GILBERT HORRAX Do you think the ventricle would be obliterated by a colloid cyst? They are usually small

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DR HORRAX Usually in cases with these colloid cysts you see a little bit of ventricle starting in the foramen of Monro, I do not see any here.

#### CLINICAL DIAGNOSES

Brain tumor, <sup>?</sup> suprasellar cyst  
Hydrocephalus

#### DR AYER'S DIAGNOSIS

Suprasellar tumor, probably craniopharyngioma

#### ANATOMICAL DIAGNOSES

Polar spongioblastoma of third ventricle  
Congenital anomalies absence of left ureter and kidney, rudimentary cervix and vagina, absent uterus

#### PATHOLOGICAL DISCUSSION

DR CHARLES S KUBIK The tumor is just where Dr Ayer thought it would be It is a large mass, measuring 7 by 5 by 3.5 cm., occupying the space between the optic chiasm and cerebral peduncles and extending upward and completely filling the greatly dilated third ventricle Microscopically the tumor has a loose structure and contains extensive accumulations of colloid like material, probably a product of degeneration The cells are fusiform and of uniform size, with scanty cytoplasm and elongated, rather slender nuclei Some of the polar processes seem to have fibrillar prolongations The tumor, which I should classify as a polar spongioblastoma, is almost identical, grossly and histologically, with two others previously observed at this hospital\* There were

\*One of these has been previously discussed (Case 21,52) Case histories of the Massachusetts General Hospital. New Eng J Med 212:1181-1184 1935

the exact location could not be determined. X-ray films of the skull showed increased convolutional markings and a long, shallow sella.

On the fourth hospital day the patient vomited a small amount of material, after which the blood pressure rose to 120 systolic, 98 diastolic. She had a frontal headache and could not sleep. One half hour later the blood pressure was 105 systolic, 80 diastolic, and the pulse 72, she felt better and went to sleep. Two days later there were no abnormal findings except choked disks. On the eighth hospital day a ventriculogram was done, which yielded a very large amount of fluid from both ventricles and showed free communication. The films showed grossly dilated lateral ventricles which were symmetrical and not displaced or otherwise deformed. There was no filling of the third and fourth ventricles or aqueduct. Air was then injected through the lumbar route and passed into the cisterna magna and forward into the upper limits of the cisterna pontis, but it did not enter the cisterna interpeduncularis or chiasmatica. It also failed to enter the fourth ventricle. The pineal gland was at the posterior limit of normal. The ventricular fluid showed 2 lymphocytes and 24 red cells per cubic millimeter and a total protein of 10 mg per cent.

Following the air injection, the patient's condition suddenly became critical. Respirations were irregular, and the patient cyanotic. The right ventricle was tapped, air gushing out under great pressure. The first part of the fluid removed was pink, later becoming grossly bloody. Fifteen minutes later the left ventricle was tapped, yielding bloody fluid. Following this her ventricles were tapped every four hours. On the ninth hospital day she again became cyanotic, respirations ceased, and the pulse could not be felt at the wrists. The right ventricle was tapped, revealing grossly bloody fluid. Artificial respiration was started and maintained for eight minutes, when the patient gasped and began breathing spontaneously. Her condition remained critical, the temperature falling to 95°F and the pulse rising to around 200. On the tenth day the temperature rose sharply to 104°F, the pulse remained at about 200, the respirations rose to 60 and she died shortly afterward.

#### DIFFERENTIAL DIAGNOSIS

DR JAMES B. AYER. A girl of eleven years, of normal birth, with eleven healthy siblings, is well until one year before admission. For three months she has daily attacks of headache located behind the right eye, associated occasionally with vomiting. The attacks are brief and do not interfere with play. As her father suffered from migraine it was probably thought that the patient was sim-

ilarly affected. Not until she has an exceptionally long attack of headache and vomiting, accompanied on the fourth day by stiffening of all limbs, do we feel that something serious is afoot. It is not worthy that the "attack" of stiffening was not accompanied by convulsions or loss of consciousness. It recalls somewhat the picture of decerebrate rigidity. An examination at this time fails to show any definite cause for her symptoms, although progressive intracranial disease must be suspected. The course of illness continues about as before until eight days before entry to the hospital when a seizure similar to the last in respect to stiffening of the limbs occurs. But this attack is accompanied by temporary blindness and unconsciousness. It is now obvious that intracranial mischief must be considered as quite certain.

Her physical status appears to be quite normal, although the patient had lost weight, and endocrinopathy is perhaps suggested by the development of the genitalia, the persistence of lanugo hair and the yellowish cast to the skin. The usual laboratory tests must be considered as negative. The mental status is said to be normal. Neurologically the examination shows at times nothing but choked disks with hemorrhage, at other times slight unsteadiness in use of the arms and legs and reflexes which are asymmetrical and variable but rarely abnormal. Apparently no abnormality of cranial-nerve function was found, except minimal nystagmus. The presence of choked disks confirms our suspicion that we are dealing with increased intracranial pressure, and the presence of convolutional markings by x-ray further strengthens this belief. But as yet we cannot say whether the pressure is due to fluid (hydrocephalus) or an expanding lesion or both.

While the course of this illness strongly suggests the progressive course of tumor, I see no symptoms or signs which can definitely localize it. Sudden accessions of headache and vomiting, here so conspicuous as a feature, frequently indicate hydrocephalus, and in children especially, we look for the cause in obliteration of the fourth ventricle or aqueduct by tumors in the cerebellum or brain stem. The paucity, at times the absence, of cerebellar and cranial-nerve signs is here strong evidence against an expanding lesion below the tentorium. Obliteration of the aqueduct by ependymitis must be admitted as a possibility, and intermittent occlusion of fluid communication in the third ventricle is not at all uncommon. A tumor in the latter region may also cause spasm in the extremities by pressure on the crura and, if large enough, may cause blindness by compression of the visual tracts. Such a tumor would unquestionably lead to internal hydrocephalus of the lateral

ventricles, and headache. By pressure or invasion of the pituitary gland and hypothalamus, endocrine and vegetative functions could be altered. I see nothing in the history or examination to suggest a lesion in the frontal, parietal, temporal or occipital lobes.

The results of the air studies, both by ventricular and lumbar routes, may be summarized as indicating a block in fluid passage from the lateral ventricles, with their consequent dilatation. It is suggested that a mass occupies the region of the third ventricle and also obstructs the basal cisternae. That this tumor did not take origin within the third ventricle is proved by the lack of separation or of deformation of the lateral ventricles.

We must therefore come to the conclusion that a tumor of considerable size occupies the territory above the sella displacing or invading the third ventricle. Such suprasellar tumors occur in children, as in adults, and, although rare, are apt to fall into the group of craniopharyngiomas.

DR. JAMES R. LINGLEY: The plain films show increased convolutional markings, and the sella turcica, although it is not enlarged, is deformed. The clinoids are pushed downward, and the sella is flattened. The anterior clinoids are sharpened, and the posterior ones are markedly eroded. However, the signs in the sella can be secondary to pressure, the result of tumor anywhere in the skull. The pineal body is very finely calcified, and by measurement it was slightly posterior to its normal position. Usually that means a tumor anterior to the pineal body. In the ventriculogram, the lateral ventricles, as you see, are markedly dilated and there is complete absence of air in the third ventricle, indicating a block distal to the foramen of Monro. After lumbar injection of air you can see air in the cervical canal. It passes anterior to the pons, fills the posterior portion of the cisterna interpeduncularis and then stops. There is a block at the posterior margin of the sella. We were hoping that the air by the lumbar route would enter the fourth ventricle and definitely rule out tumor below the tentorium. The fact that it did not fill is not very good evidence in favor of a cerebellar tumor, however, as it occasionally does not fill in the normal person.

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little bolder and suggest an even rarer lesion—a colloid cyst of the third ventricle. The absence of separation of the lateral ventricles may be against this, but the history is suggestive. We have a year's history of intermittent daily headaches of short duration, strongly suggesting an intermittent cause such as a pedunculated tumor. This is supported by the normal visual acuity which shows that papilledema was of recent development. If we suppose the tumor originated rather to the right side we could explain the fact that the early headaches were largely right-sided.

DR. AYER: I considered that, but this x-ray film which we have seen showing no evidence of separation of the lateral ventricles is strong evidence against it.

DR. GILBERT HORRAX: Do you think the ventricle would be obliterated by a colloid cyst? They are usually small.

DR. AYER: I should expect to see some of the third ventricle.

DR. HORRAX: Usually in cases with these colloid cysts you see a little bit of ventricle starting in the foramen of Monro, I do not see any here.

#### CLINICAL DIAGNOSES

Brain tumor, <sup>2</sup> suprasellar cyst  
Hydrocephalus

#### DR. AYER'S DIAGNOSIS

Suprasellar tumor, probably craniopharyngioma

#### ANATOMICAL DIAGNOSES

Polar spongioblastoma of third ventricle  
Congenital anomalies: absence of left ureter and kidney, rudimentary cervix and vagina, absent uterus

#### PATHOLOGICAL DISCUSSION

DR. CHARLES S. KUBIK: The tumor is just where Dr. Ayer thought it would be. It is a large mass, measuring 7 by 5 by 3.5 cm., occupying the space between the optic chiasm and cerebral peduncles and extending upward and completely filling the greatly dilated third ventricle. Microscopically the tumor has a loose structure and contains extensive accumulations of colloid-like material, probably a product of degeneration. The cells are fusiform and of uniform size, with scanty cytoplasm and elongated, rather slender nuclei. Some of the polar processes seem to have fibrillar prolongations. The tumor, which I should classify as a polar spongioblastoma, is almost identical, grossly and histologically, with two others previously observed at this hospital.\* There were

\*One of these has been previously discussed (Case 21757). Case histories of the Massachusetts General Hospital. New Eng. J. Med. 212:1181-1184, 1935.

three small implantations on the roots of the cauda equina

DR. MALLORY There were a few surprising findings in the remainder of the autopsy that had little to do with the clinical course. The genitourinary tract was very abnormal. At the apex of the vagina was a small nubbin 8 mm in diameter which appeared to represent the cervix. There was no uterus above it, however. One kidney and one ureter were entirely missing. On the same side there was a perfectly good tube and ovary. On the other side no tube was found but an elongated cord which had no lumen. It ran out into the sigmoid mesentery and at its end was a fusiform structure which contained a small amount of ovarian tissue.

### CASE 25092

#### PRESENTATION OF CASE

A twenty-eight-year-old, Irish-American man entered complaining of abdominal swelling and constipation.

For one and a half years preceding entry the patient had occasional attacks of epigastric discomfort appearing approximately half an hour after meals and relieved by soda. They did not follow every meal. He believed that they were due to the ingestion of catsup. Two weeks prior to entry, after a day of heavy lifting, he noted a feeling of fullness in his lower abdomen. The following day he felt distinctly under par and noted that his abdomen was sore to touch below the umbilicus, especially on the right side. He went to work the next day and noted distention of the lower abdomen on returning home that evening. Since he had been constipated for three days he had recourse to an enema, which resulted in the passage of gas but no feces. The following day, three days after onset, he remained at home and was given three "high enemas," which produced only gas. On the same day he took an entire bottle of citrate of magnesia, which caused the passage of a moderate amount of hard, dark feces and a large amount of gas. Following this the distention and soreness were much relieved and he felt better. He took "laxatives" twice daily after this and had a bowel movement once a day. On the sixth day before entry he stopped taking laxatives and returned to work. He had no bowel movement until two days before admission, following a large dose of laxative. In spite of the bowel movement his general malaise, lower abdominal distention and soreness in the right lower quadrant returned. Nausea and vomiting did not occur at any time during his illness. His symptoms became progressively worse, although

he slept well on the second night before entry. He took laxatives several times, and each dose was followed by the passage of small amounts of hard dark-colored stools and much gas. During the night preceding the day of entry his symptoms caused him to sleep very poorly, although he felt better in the morning. He was persuaded by his family and friends to come to the hospital for a "checkup." During the two days before entry he had taken nothing by mouth except fruit juices and water. Previously his appetite had been normal and he had been eating the usual types of food. His bowels had been regular and normal in appearance until the onset of his present illness. He had not lost weight. His past and family histories were noncontributory.

Physical examination revealed a well-developed and nourished man, not acutely ill. The head and chest examinations were negative. The blood pressure was 110 systolic, 74 diastolic. The abdomen was somewhat distended and tympanic. There was some spasm on the right, most marked over McBurney's point. The right lower quadrant was dull to percussion, and there was tenderness over a 5 cm area at McBurney's point. A 5 by 3 cm mass seemed to be present in the right lower quadrant but was palpated with difficulty because of the spastic abdominal wall. There was no indirect tenderness. Rectal examination was negative. Examination of the stools showed a 4+ guaiac test on the day of admission and negative tests on the second and fifth hospital days.

The temperature was 100.4°F, the pulse 96, and the respirations 24.

Urine examination was negative. The blood examination showed a red-cell count of 4,000,000 with 75 per cent hemoglobin, and a white-cell count of 17,000 with 85 per cent polymorphonuclears, 3 per cent large lymphocytes, 10 per cent small lymphocytes, 1 per cent monocytes and 1 per cent eosinophils. The nonprotein nitrogen of the serum was 26 mg, the serum protein 6.8 gm and the carbon dioxide combining power 65 l vol per cent. The chlorides were equivalent to 99 cc of N/10 sodium chloride. A blood Hinton test was negative.

A barium enema flowed without delay to a point in the transverse colon opposite the spine, where it stopped. After amyl nitrite had been administered, the barium was seen to trickle through a small opening about 5 mm in diameter. The constriction measured about 8 cm in length, and the mucosal pattern was entirely destroyed. Beyond this the hepatic flexure and ascending colon filled well. The cecum had a filling defect on its medial margin, which corresponded to the lat-

eral margin of the tumor palpated in this area. The terminal ileum filled and had a similar pressure defect from the tumor. The tumor was the size of a large grapefruit.

On the seventh hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR JAMES E. FISH. First of all we note some epigastric trouble that he had had for a year and a half, which, while inconclusive, is somewhat suggestive of ulcer. I think that we can consider it more or less irrelevant so far as the present difficulty is concerned. At least that is the hypothesis with which I must start.

Fourteen days before admission he had the first of a new series of symptoms, and I think one always should attach a great deal of importance to the first symptom. This was fullness in the abdomen. It was not pain in the abdomen or vomiting—simply fullness. On the thirteenth day before admission he had some soreness in the right lower quadrant, which came on after the fullness. On the twelfth day he was more distended, but we still have not heard particularly about pain, just distention. He took three enemas and a bottle of magnesium citrate, which is a moderately good dose of salts, and passed a large amount of gas and hard feces. Then he was considerably relieved. On the eleventh, tenth, ninth, eighth and seventh days before admission he appears to have stayed home, taking various sorts of laxatives, and on the sixth day felt enough better to go back to work. Up to this time the only clue we have is that of obstruction. For three days after returning to work he had no bowel movements, and toward the end of that period he again began to notice discomfort in the right lower quadrant and distention. On the second day before admission he was feeling considerably worse. He was more distended and he had more soreness in the right lower quadrant than he formerly had had. It is interesting to note that he had no nausea or vomiting. Assuming that he had an obstruction low in the large bowel, one might readily understand the absence of vomiting, but I think it is rather unusual not to have had some degree of nausea. Possibly he had more than is indicated by the story, since he declined food except fruit juices and water. This onset should not be spoken of as sudden. It was not a fulminating sort of obstruction, and yet it was rather abrupt. We have the impression from the history that over a considerable period of time he had no change in bowel habits. They had been practically normal, without change,—and that is significant,—right up until two weeks

before admission. Furthermore, we get the story that he had not lost weight. This seems to be considerable evidence against obstruction due to carcinoma. To what then is his obstruction due?

From his physical examination we find that he had tenderness and spasm in the region of McBurney's point, and a small mass 5 by 3 cm in diameter was felt. This tender mass would lead us to believe that the trouble probably was inflammatory. We have corroborative evidence of an inflammatory process in the temperature, which was 100.4°F and in a white count of 17,000. With an inflammatory mass in the region of the cecum it is surprising that he did not have any rectal tenderness. We then learn that guaiac tests on his stools were very inconstant. On one occasion he had a strongly positive test, and on two other occasions there was no blood. The hard, dark feces passed at home may have contained blood, it is not at all certain, however. I do not believe we can attach any special significance to them. He did not appear to be acutely ill at the time of admission, so that if he had obstruction it must have been partial, intermittent or low down.

From the laboratory work we are not able to gather very much that really helps us. He had a slight degree of anemia, a rather pronounced polymorphonuclear reaction and a total white count of 17,000. We note that he had 13 per cent lymphocytes and only 1 per cent monocytes, which is a ratio of 13:1, sometimes said to be suggestive of tuberculosis. The nonprotein nitrogen, the sodium chloride, the carbon-dioxide combining power and the serum protein were all within normal limits. The most we can say at this point is that the man appeared to have rather low obstruction, plus evidence of an inflammatory process, either primary or secondary to the mechanical obstruction.

The x-ray evidence ought to be very helpful. Instead it is confusing. The barium enema flowed to a point in the transverse colon opposite the spine, where it stopped. On physical examination on admission no mention was made of any mass or tumor in the region of the transverse colon. The mass described was at McBurney's point. Then on further interpretation of the films we learn that with amyl nitrite, presumably not before but after it was administered, barium was seen to trickle through a 5-mm lumen. That is a very small opening. Since the barium did not go through the opening before but did so after the administration of amyl nitrite, it leads one to suppose that there was some element of spasm as a cause of this obstructing lesion. Then we read farther on that the constriction was 8 cm in length, considering the extreme smallness of the lumen, this is

rather long I do not believe that is at all consistent with carcinoma of the transverse colon, in the absence of symptoms of more than two weeks' duration. I am somewhat puzzled by the fact that the mucosal pattern was entirely destroyed. That would lead us to believe that there was an intrinsic lesion in the bowel, which might be a carcinoma. An extrinsic lesion or pressure should not wipe out the pattern. I have been toying with the thought that this was a rather intermittent type of obstruction, very severe at one moment and letting up at another, over a period of two weeks. He might conceivably have had an intussusception, even though it is a rare lesion in adults.

Reading farther on, we get information about the mass in the region of the cecum and we find that it was on the medial side of the cecum, in the area between the terminal ileum and the cecum, and instead of being 3 by 5 cm it was about the size of a grapefruit. In other words, it grew from 5 to 15 cm in the week in the hospital. This could hardly be consistent with anything except an abscess. I am entirely at a loss to know whether we are dealing with two tumor masses or one confluent mass. It is possible that the obstructing mass in the transverse colon which the x-ray man picked up was not present at the time of admission to the hospital. It may have been more or less intermittent in nature, but the tumor mass in the region of the cecum was more constant and was undoubtedly an abscess.

DR. AUBREY O. HAMPTON: I might say that these films are about as confusing to me as they are to Dr. Fish, particularly after reading the history. In the first plain film he did have evidence of small-bowel obstruction and no evidence of colonic obstruction. The ileum was dilated and filled with gas at that time. In this film, taken one day later, the cecum and ascending colon are dilated, but with the barium enema, and these loops of small bowel are still filled with gas. The soft-tissue mass, which seemed to be demonstrated very well after barium, is not seen in the plain film, there is diffuse density in the right lower quadrant, which seems to press the cecum up and backward a little. The tip of the cecum is at the crest of the ilium, so if we were to select the center of the mass after the barium enema we would place it at a point midway between the transverse colon, which is at the upper margin, and the tip of the cecum, which is at the lower margin, or about at McBurney's point. Then after studying the mucosa and the defect in the transverse colon we are almost forced to the conclusion that the mass involved the mucosa of the transverse colon. This is at least so in one or two of the films. You get the impression that the de-

fect in the colon changes in shape, particularly here. It is smooth and conical at one extremity and markedly irregular at the other, although it does look as if it had changed in size and shape. Amyl nitrite also changes it, so we might assume that instead of the mucosal pattern's being destroyed we are not able to demonstrate it because of contraction of the colon. I think it is true that at times we are unable to demonstrate the mucosa when it is involved by extrinsic disease, because the musculature is so contracted that we cannot spread it out by pressure in normal fashion. We injected air, a double contrast enema, which shows a picture quite consistent with carcinoma. The defect has again changed somewhat. This time it appears to resemble a carcinoma of the transverse colon, but the lesion of the colon is not in the center of the mass, it is at the upper margin.

DR. FISH: Where is the lesion that is 8 cm long?

DR. HAMPTON: From here to here in the transverse colon. The ileum, strangely enough, crosses the center of the mass and is perfectly normal at this time except for displacement.

DR. FISH: You would not say there was spasm in the ascending colon?

DR. HAMPTON: The cecum is contracted slightly but the ascending colon is not.

DR. FISH: The ascending colon appears free from intrinsic disease?

DR. HAMPTON: Yes, the only thing wrong is dilatation.

DR. FISH: I did not visualize a low transverse colon with a mass as far toward the right as this is. I think in view of the x-ray picture it is perfectly logical to conclude that the whole process is limited to one tumor mass. It would seem now that intussusception was an idle, passing thought. It is conceivable that the degree of obstruction might be intermittently aggravated somewhat by spasm and extrinsic pressure. At least we have to think of some manner in which this man with an opening in his bowel of only 5 mm was able to get along without completely blowing up. It is possible that the inflammatory mass near the cecum represents perforation of an otherwise normal cecum, due to back pressure from obstruction lower down in the transverse colon, thereby producing the abscess mass. We certainly cannot rule out the possibility of carcinoma in the transverse colon, in view of what Dr. Hampton has said, and we have to account for a tender inflammatory mass which may have occurred in the way I have just mentioned or may have resulted from infection burrowing through the wall of the tumor itself. I should like to entertain the pos-



sibility of tuberculosis. It would be rather unusual to find a localized tuberculous lesion in the transverse colon without ulceration or some other evidence of the disease in the cecum and ascending colon. Also, we would expect to find more evidence of tuberculosis in the terminal ileum. At least, it is a possibility that is hard to dismiss in view of obstruction in a young man with evidence of an inflammatory process. There are other inflammatory processes that we might think of, actinomycosis for example. He may have had some other form of cancer. The tumor might have been caused by a neoplasm of the lymphoma series, a lesion involving the wall of the transverse colon plus a large, broken-down mass of nodes in the region of the cecum. I cannot narrow it down to any finer diagnosis than that.

DR. LELAND S. MCKITTRICK: I am more confused than Dr. Fish was. May I ask Dr. Hampton whether he believes, as stated here, that there was an ulcerating lesion in the ileocecal region?

DR. HAMPTON: No, the x-ray report stated that the mucosal pattern in the transverse colon over an 8-cm. area was destroyed. I said that I thought it was fair to say that we cannot at times determine whether the mucosa is destroyed or not. Where the colon is this small, due to any disease, the mucosal pattern cannot be demonstrated. You have to be able to spread it out to demonstrate the pattern.

DR. GEORGE W. HOLMES: Dr. Hampton, do not some of our cases with infection show edema of the mucosa? Such a condition would eliminate the normal mucosal pattern.

DR. HAMPTON: Yes, an inflammatory process could do the same thing.

DR. FRANKLIN J. BALCH, JR.: Under any circumstance, do you not have to think of appendiceal abscess and spasm of the transverse colon as being responsible for that defect?

DR. FISH: I did not seriously consider an appendiceal abscess because the sequence of events suggested obstruction followed by inflammatory complications rather than the other way around. Furthermore, because of the attachments of the meso-ileum and meso-cecum, it is rather unusual to have an appendiceal abscess that pushes the ileum downward from a position medial to the cecum.

#### PREOPERATIVE DIAGNOSIS

Carcinoma of colon with perforation

#### DR. FISH'S DIAGNOSIS

Carcinoma or lymphoma of colon with perforation and localized abscess

#### ANATOMICAL DIAGNOSES

Subacute appendicitis

Appendiceal abscess

#### PATHOLOGICAL DISCUSSION

DR. RICHARD H. WALLACE: My preoperative diagnosis was cancer of the colon with perforation. On exploration there was no peritonitis, but there was a mass that involved the cecum, ascending colon and the right part of the transverse colon. The terminal ileum was involved in the mass and was so markedly dilated and obstructed that I did a preliminary operation—an ileotransversostomy. A week later we explored again, planning to do a right colectomy. In freeing up the tip of the cecum we identified a thick, porky appendix, so we removed it. The appendix crossed over the terminal ileum, obstructed the latter and lay behind and medial to the ascending colon with the tip at the spot in the transverse colon which showed the defect by x-ray. It was long, and the distal portion was entirely necrotic. At the time of operation the abscess, if there had been one, had been absorbed.

DR. MALLORY: You noted just before the second operation that the mass seemed smaller than it was previously?

DR. WALLACE: Yes. My impression on opening the abdomen the first time was that the mass was malignant. The lateral gutter was free and the mass was movable.

I should have said he had an x-ray check later, which showed a normal colon.

DR. HAMPTON: I have proof here that the colon was normal after operation. This is the same area in the transverse colon which was abnormal before operation.

A PHYSICIAN: Did the fecal stream go the normal way or through the ileostomy?

DR. HAMPTON: I do not have the report but believe that it went both ways.

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## PNEUMONIA AND THE HEALTH OF THE NATION

PHYSICIANS in their capacity of citizens of the United States may be divided in their opinions as to the wisdom of the extension of governmental activities in various phases of the practice of medicine. However, it cannot be denied that much valuable service is being rendered to the medical profession and, both directly and indirectly, to the health of the nation by a number of governmental agencies. Foremost among such agencies stands the United States Public Health Service which already had many notable achievements to its credit.

One of the more recent interests of the United States Public Health Service, following the creditable pioneer activities in that field conducted under the auspices of the Massachusetts Department of Public Health, has concerned pneumonia. In

undertaking to co-ordinate, on a national basis, the various pneumonia-control programs already under way or being contemplated in the various states, it was necessary first to obtain reliable information concerning the extent and importance of the problem. The National Health Survey conducted by the United States Public Health Service, with the aid of a financial grant from the Works Progress Administration, has recently brought to light useful information in this respect.

In a recent release\* it is stated that the reports are based on a house-to-house canvass of some 800,000 families, including 2,800,000 persons, in eighty-three cities and twenty-three rural areas in nineteen states, during the winter of 1935-1936. The total surveyed population was so distributed as to give a sample which was, in general, representative of cities of the United States according to size and region. In large cities (100,000 and over) the population to be canvassed was determined by random selection of many small districts based on those used in the United States Decennial Census of 1930. In the small cities selected for the study, the population was enumerated completely. The data covered a period when the death rate of pneumonia was neither high nor low in comparison with the average for a seventeen year period.

The practicing physician during the height of the season may be called on to care for one or, at most, a small number of patients with pneumonia. A few excerpts from the report of this survey may help him to appreciate the significance of the disease in its broader perspective. Incidentally, some of the findings again bring to a focus the problems of the cost of medical care.

The pneumonia case rate among families on relief was found to be over twice that among families in the upper income groups. There was also an excess in the rates among families who were not on relief but whose incomes were less than \$125 per month.

Pneumonia, which disables more than 5 out of every 1000 persons in urban communities during

\*Release (No. 16-27) from the United States Public Health Service dated February 3, 1939.

the course of a year, was most prevalent among children and old persons. The annual frequency rate of pneumonia among children under three years of age was 18 per 1000 and among persons sixty-five years and over 11 per 1000, while the rate among youths and young adults (fifteen to forty-four years) was only 3 per 1000.

It is stated that men, from birth to old age, are more likely to have pneumonia than are women. For men, the annual frequency rate was found to be 6.0 per 1000, while it was only 4.9 for women. The greatest excess in the male over the female rate, 48 per cent, occurred in the youth group (fifteen to twenty-four years). In the other age groups the excesses ranged from 16 to 24 per cent, with the exception that among persons sixty-five years and over, the rates showed no appreciable difference by sex.

The average duration of disability of non-fatal pneumonia cases was observed to be forty-two days, and of fatal cases nineteen days. For all pneumonia cases—fatal and non-fatal—the average period of disability was thirty-nine days. Previous bulletins issued by the National Health Survey gave durations for acute illnesses (disabling for a week or longer) as forty-six days for accidents, twenty-four days for infectious diseases and nineteen days for all respiratory causes. The director points out that a comparison of these figures shows that pneumonia ranks among the most severe acute diseases.

In issuing this report the United States Public Health Service warns that early diagnosis with prompt and continuous medical care is recognized as extremely important if the severe course of pneumonia is to be lessened and death prevented. While the services of a doctor are indispensable in the proper treatment of pneumonia, the federal health authorities also point out the important role of proficient bedside nursing in the management of this disease and the necessity of hospital care for some cases. Previous *Public Health Reports* have stressed the need for wide and speedy application of serum therapy but have also called attention to the high cost of treatment, whether it includes serum or not. The conclusions drawn

from the National Health Survey are to the effect that those in the high-income groups are given relatively good care, regardless of the size of city in which they live, while those in the low-income groups are less well cared for in the small communities than they are in the large.

## FURTHER LIGHT ON CHILDHOOD TUBERCULOSIS

A CONTRIBUTION by Smith, published last year in the *Journal*,\* deserves thoughtful consideration, particularly in view of the very decided change in attitude toward childhood tuberculosis that has come into existence in late years. Primary tuberculosis in childhood, once believed to sound the doom-tocsin for that individual, is now recognized as fundamentally a benign process. Even tuberculosis in infancy, seriously as it still must be considered, is nevertheless far from exacting the high and immediate toll of life that was once attributed to it.

In both infancy and childhood, tuberculosis mortality continues to decrease rapidly, more rapidly, however, in infancy, where the mortality is also still the higher. What are the dangers that still accompany these infections? How can they best be met? This is the problem that Smith seeks to cast light on by a study of the 345 deaths due to tuberculosis that occurred in the Infants' and Children's hospitals in Boston from 1923 through 1937.

One death occurred from tuberculosis for every 59 infants admitted to the Infants' Hospital, where the age limit is two years, in the Children's Hospital, admitting patients from two to twelve years of age, 1 death occurred from tuberculosis for every 95 admissions. The majority of the infants died with both miliary tuberculosis and tuberculous meningitis, 20 per cent with pulmonary tuberculosis or tuberculous pneumonia, only 10 per cent with tuberculous meningitis alone. In the two-to-seven-year group 63 per cent died of the combined lesions, and 32 per cent of meningitis alone, in the seven-to-twelve-year group only 8 per cent died of miliary tuberculosis and 75 per cent of meningitis.

Smith C. A. The dangers of tuberculosis in childhood. New Eng J Med 219:260-265 1933

alone. In the older groups no pulmonary lesions were found in those coming to autopsy.

The inference drawn is that once an infected individual has safely passed the years of infancy, there is relatively little chance of dying of tuberculosis until the adolescent years, with their increased risk of reinfection, are reached. Deaths due to meningitis unaccompanied by military tuberculosis may be regarded as unpredictable accidents, resulting from the rupture of a previously unsuspected central-nervous-system focus.

The child with a primary tuberculous infection, then, requires not sanatorium care or restricted activity, but only intelligent oversight, with periodic x-ray examinations of the chest and life in an environment free from the possibility of further exposure and reinfection. Herein, also, lies the wisdom of a careful system of case finding, for every individual with tuberculosis due to infection with the human type of bacillus received it from another individual, and in further exposure lies his greatest danger.

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### POSTPARTUM HEMORRHAGE LACERATION OF THE CERVIX

Mrs. M. C., a seventeen-year-old primipara, was admitted to the hospital at term on November 18, 1915, in active labor. For five days before entry she had been having irregular, uncomfortable abdominal pain, which was probably due to an irritable uterus. Twelve hours previous to entry these pains had become more marked and closer together.

Her past history was negative except for the usual childhood diseases. Catamenia began at twelve, were regular with a twenty-eight to thirty-day cycle and lasted four days. Her last menstrual period was February 12, making the expected date of confinement November 19. The family history was irrelevant.

Her present pregnancy had been entirely normal. There had been no albuminuria, hyper-

tension or symptoms suggestive of toxemia of pregnancy. The general physical examination on entry revealed no abnormalities. The heart was not enlarged, there were no murmurs or arrhythmias. The blood pressure was 104 systolic, 78 diastolic. The lungs were clear and resonant. The chest showed normal expansion. The uterine contractions were irregular, but the uterus relaxed well between contractions. The head was fully engaged and in ODA position. The fetal heart rate was 140, heard in the left lower abdominal quadrant. The membranes were intact. A rectal examination revealed the cervix to be two and a half fingers dilated and of soft consistence. The pelvic measurements were I C 25.5 cm, I S 25 cm, E C 18 cm, outlet 8.5 cm.

Immediate delivery was deemed advisable by the doctor in charge of the case because of fear of the development of a contraction ring in view of the length of time the patient had had uterine contractions. The patient was therefore anesthetized with ether, and the cervix was manually dilated. A forceps was applied over the baby's ears. Great difficulty was encountered in drawing the head through the cervix. After one hour of hard pulling at regular intervals the cervix finally split laterally, following which the head was readily extracted. The baby breathed and cried normally following its delivery. An examination of the perineum revealed a third-degree laceration. The placenta and membranes were expressed intact on the sixth uterine contraction. Bleeding was profuse, the patient lost well over 500 cc. of blood within a short time. In order to control bleeding from the cervix, six catgut through and through sutures were placed in each side to close the bilateral lacerations, which apparently did not extend out into the vaults. The perineum was then repaired, using chromic catgut and silkworm gut sutures. The patient by this time was in moderately severe shock and was treated by administration of caffeine, heaters and a subpectoral infusion of 500 cc. of normal salt solution. She responded well, and the pulse rate rapidly came down to 120.

The first eight days after delivery were complicated by a sustained febrile reaction, the temperature varying from 100 to 102.5°F. Her temperature then became normal, and she was discharged on the twenty-first postpartum day. The perineum at this time was healed. The cervix was bilaterally scarred, while the vaults were free. The uterus was anterior and well involuted.

*Comment.* This case is presented not only for its historical interest (it occurred twenty-three years ago) but as an example of the near tragedy that so often follows meddling some operating

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

As one reviews this case, one finds no reason whatever for doing anything to this patient. In 1915, just about the high point of the accouchement forcé era was reached. Familiarity breeds contempt, and so long as this patient survived the operation, the same procedure was probably repeated the next day. Since then, obstetrics has shown no more intelligent advance than an appreciation of the physiology of the cervix, and of the dictum that no patient should be delivered whose cervix is not fully dilated.

Tears like these may occur in normal labors, but serious tears that follow operative deliveries invariably mean poor judgment and bad obstetrics, neither of which should be tolerated by our present-day hospitals.

#### LEGISLATIVE NOTES

All members of the Massachusetts Medical Society should carefully read the bills printed below. A post card will be sent to each member on which he is to indicate his position in regard to the bills. The Council of the Society unanimously opposed H. 985 and H. 986. H. 60 was approved by the Council by a vote of 114 to 34. Facts concerning it were given on the editorial page last week. It has been agreed to delete the controversial phrase "such other information as the board may require" that has caused much adverse comment. It will strengthen the position of the Society before the legislature in other matters if we can show them that a large majority of the Society oppose the first two bills and favor the last.

CHARLES C. LUND, M.D., *Chairman*

\* \* \*

#### HOUSE BILL 985

AN ACT TO REQUIRE DOCTORS OF MEDICINE AND DOCTORS OF OSTEOPATHY ON THE BOARD OF REGISTRATION IN MEDICINE.

*Be it enacted by the Senate and House of Representatives in General Court assembled and by the authority of the same as follows:*

SECTION 1 Section ten of chapter thirteen of the General Laws, as amended by chapter eight of the acts of nineteen hundred and thirty two, is hereby further amended by adding to the first sentence the words — five of whom shall be doctors of medicine and two of whom shall be doctors of osteopathy, — so as to read as follows —  
 Section 10 There shall be a board of registration in medicine, in the two following sections called the board, consisting of seven persons, residents of the commonwealth, registered as qualified physicians under section two of chapter one hundred and twelve, or corresponding provisions of earlier laws, who shall have been for ten years actively engaged in the practice of their profession, five of whom shall be doctors of medicine and two of whom shall be doctors of osteopathy. No member of said board shall belong to the faculty of any medical college or university, and no more than three members thereof shall at one time be members of any one chartered state medical society. One member thereof shall annually in June be appointed by the governor, with the advice and consent of the council, for seven years from July first following.

SECTION 2 The provisions of this act shall become effective as of the time of the appointment for the term

beginning July first, nineteen hundred and thirty-nine, as to the first doctor of osteopathy, and, as of the time of the appointment for the term beginning July first, nineteen hundred and forty, as to the second doctor of osteopathy.

#### HOUSE BILL 986

AN ACT PROVIDING FOR A DOCTOR OF MEDICINE AND A DOCTOR OF OSTEOPATHY ON THE APPROVING AUTHORITY AND THE STATUS OF APPROVALS BY THE AMERICAN MEDICAL ASSOCIATION AND THE AMERICAN OSTEOPATHIC ASSOCIATION.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

SECTION 1 Section two of chapter one hundred and twelve of the General Laws is hereby amended by striking out the first sentence, as appearing in section one of chapter two hundred and forty-seven of the acts of nineteen hundred and thirty six, and inserting in place thereof the following —

Each applicant who shall furnish the board with satisfactory proof that he is twenty-one or over and of good moral character, that he possesses the educational qualifications required for graduation from a public high school, that he has completed two years of premedical collegiate work, including physics, chemistry and biology, in a college or university approved by a body consisting of two members of the board, appointed by the chairman at the regular board meeting in July each year, who shall hold their offices for one year, one of whom shall be a doctor of medicine and the other a doctor of osteopathy, the commissioner of education and the commissioner of public health, herein referred to as the approving authority, that he has attended courses of instruction for four years of not less than thirty-two school weeks in each year, or courses which in the opinion of the board are equivalent thereto, in one or more legally chartered medical schools, and that he has received the degree of doctor of medicine, or its equivalent, from a legally chartered medical school, having the power to confer degrees in medicine and approved by the approving authority, shall, upon payment of twenty five dollars, be examined, and if found qualified by the board, be registered as a qualified physician and entitled to a certificate in testimony thereof, signed by the chairman and secretary.

SECTION 2 Section four of chapter two hundred and forty seven of the acts of nineteen hundred and thirty six is hereby amended by adding at the end thereof the following sentence —

And the approving authority shall approve all medical schools, which have the approval of the American Medical Association, and all osteopathic schools which have the approval of the American Osteopathic Association, unless the decision to the contrary by the approving authority is unanimous on the part of all its members.

#### HOUSE BILL 60

AN ACT REQUIRING THE ANNUAL LICENSING OF QUALIFIED PHYSICIANS

SECTION 1 Chapter one hundred and twelve of the General Laws, as appearing in the Tercentenary Edition thereof, is hereby amended by inserting after section four the following new section

SECTION 4A Every person registered as a qualified physician, who is engaged in the practice of medicine with in the commonwealth, shall annually in December trans-

alone In the older groups no pulmonary lesions were found in those coming to autopsy

The inference drawn is that once an infected individual has safely passed the years of infancy, there is relatively little chance of dying of tuberculosis until the adolescent years, with their increased risk of reinfection, are reached Deaths due to meningitis unaccompanied by miliary tuberculosis may be regarded as unpredictable accidents, resulting from the rupture of a previously unsuspected central-nervous-system focus

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was a member of the staffs of several private hospitals at the time of his death

Among his affiliations were fellowship in the American College of Surgeons and memberships in the Massachusetts Medical Society and the American Medical Association.

His widow, a daughter, four sons and two brothers survive him

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**TOWER** — FREDERICK R. TOWER, M.D., of Arlington, died February 25. He was in his seventy-ninth year.

Born in Boston, the son of the late Dr. George H. Tower, he received his degree from the Harvard Medical School in 1892. Among his fellowships were the Massachusetts Medical Society and the American Medical Association. Two nieces and two nephews survive him.

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## MISCELLANY

### CONFERENCE ON MEDICAL PATENTS

At the direction of the House of Delegates, the Board of Trustees of the American Medical Association has issued a call, in a letter to medical schools, pharmaceutical firms and other research agencies, for a national conference to consider problems involved in the patenting of products concerned with the prevention and treatment of disease and with public health in general.

This conference, to be held Thursday, March 16, at the headquarters of the American Medical Association, 535 North Dearborn Street, Chicago, will be presided over by Dr. Roger I. Lee, of Boston, a member of the Board of Trustees of the American Medical Association.

The first session will start at 10 a. m. and the second one at 2 p. m. on March 16. The various aspects of the subject of the call will be introduced by speakers familiar with them, followed by general discussion.

The theme of the conference is "The Administration of Medical Patents for the Public Welfare." The proceedings will be published in full or in abstract in the *Journal of the American Medical Association*.

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### YOUR HEALTH BROADCASTS

The next series of "Your Health" broadcasts, sponsored by the American Medical Association and the National Broadcasting Company and heard over the Blue Network each Wednesday at 2:00 p. m., is entitled "Community Health." It consists of four broadcasts as follows:

March 8. Water, Waste and Sanitation

Importance of community control of water supplies; sewage disposal and general sanitary matters.

March 15. Guarding Fresh Foods

What the community can and must do to protect fresh foods, such as fish, fruits, vegetables, meats, bakery goods.

March 22. Auditing the Health Record

The meaning and the importance of vital statistics; contagious disease reporting and community health records.

March 29. Animal Diseases Transmitted to Man

Rabbit fever, rabies, undulant fever and similar infections, and what can be done about them.

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### MEDICAL HISTORY NOTES

A second Graduate Week in Medical History will be held under the auspices of the Institute of the History of

Medicine at the Johns Hopkins University, Baltimore, April 24 to 29. The first Graduate Week, held in April, 1938, was attended by thirty-three members from sixteen states and Canada.

For the present session, one lecture will be given every morning by members of the staff of the Institute of the History of Medicine, and the afternoons will be devoted to informal round table seminars. As in the past, several exhibitions will be held. The general subject to be considered during the Graduate Week is "The Renaissance."

Following the meeting at Baltimore, the annual meeting of the American Association of the History of Medicine will take place in Atlantic City. The council of the association will meet on April 30, and the annual meeting will take place with a special program on May 1. It should be noted that the *Bulletin of the Institute of the History of Medicine*, published by Johns Hopkins University, is now the official organ of the American Association of the History of Medicine.

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## CORRESPONDENCE

### CONVALESCENT CARE

*To the Editor*—The editorial in the recent number of the *Journal* interests me greatly, and I am much pleased to see that the *Journal* is recognizing the great need of this type of professional care of our patients. The tendency of late, of course, has been to hasten the discharge of the patients from the hospitals, either the medical cases or the surgical cases, with the result that many of them are sent out in a relatively very poor condition of health.

The whole question of convalescence is very little understood by the active profession today, and I know of no field in which there are greater opportunities for scientific research than that which concerns the physiology of the convalescent. The younger members of the hospital staffs have very little appreciation of all that is involved in this and pay very little attention to the patients after they are discharged from the wards. The older men, as a rule, understand much more about that which convalescence represents, realizing from empirical experience, perhaps, that which helps people to recovery and appreciating, at the same time, the personality of individuals upon which so much of health depends.

With properly organized convalescent hospitals there would be a wonderful opportunity for some of the older members of the profession, who, perhaps, are not equal to the strain of active service in general hospitals but who could continue for many years the direction of convalescent hospitals, and bring their years of experience to very practical usefulness in this work. With the chronic patient, especially the arthritic, the class that very greatly needs convalescent hospital type of care, the opportunity for service by experienced physicians is very great. Undoubtedly one reason why the convalescent hospitals connected with the general hospitals of Boston were discontinued was that the only medical care that the patients received there was given by the house officers in the very beginning of their hospital connection before they had had any real experience in handling patients and when they were entirely unprepared for treating patients at the time when the greatest medical skill is oftentimes needed.

Another feature, of course, which it seems to me should be considered is the fact that as hospitals are being built today, the costs, as I understand it, are from \$5,000 to \$10,000 a bed, while a convalescent hospital could be built so that

mit to the board a license fee of two dollars together with a statement made on a blank furnished by the board at his request and signed by him under the penalties of perjury, giving his name, his registration number, the date of his registration, and his professional address, provided that such statement may be so transmitted at any time prior to April first next following upon the payment of a license fee of two dollars together with a further fee of one dollar for each month or part thereof that he is in default, and provided further that every registered qualified physician who withdraws from the practice of medicine within the commonwealth shall be exempt from transmitting such license fee or statement during the time of such withdrawal if he notifies the board in writing of such intended withdrawal. After such a withdrawal and prior to re-entering the practice of medicine within the commonwealth, every qualified registered physician shall transmit to the board a license fee of two dollars and the statement aforesaid. The board shall give to each qualified registered physician transmitting the fee and statement hereunder a certificate stating that he has complied with the provisions of this section and he shall display such certificate continuously in a conspicuous place in his office during the period covered by such certificate. Every person registered by the board as a qualified physician, who is engaged in the practice of medicine within the commonwealth, shall notify the board promptly of any change of his professional address, giving his new address in writing. Whoever, being duly registered under section two or corresponding sections of earlier laws, practices medicine within the commonwealth without complying with the requirements of this section, shall be punished by a fine of not less than five nor more than one hundred dollars.

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 6

##### BARNSTABLE

Sunday, March 12, at 4 00 p m., at the Cape Cod Hospital, Hyannis. Subject—Heart Disease The treatment of 'heart attacks' or 'cardiovascular emergencies'. Instructor Samuel A Levine. Donald E Higgins, *Chairman*

##### BERKSHIRE

Thursday, March 9, at 4 30 p m., at the House of Mercy Hospital, Pittsfield. Subject—Bright's Disease and Hypertension. Evaluation of new therapy, diagnosis. Instructor Laurence B Ellis. Melvin H. Walker, Jr., *Chairman*

##### BRISTOL NORTH

Thursday, March 9, at 4 00 p m., at the Morton Hospital, Taunton. Subject—The Control and Treatment of Respiratory Infections. (This is to include the serological treatment of pneumonia in infants and children.) Instructor Harold A. Higgins. Lester E. Butler, *Chairman*

##### BRISTOL SOUTH (Fall River Section)

Tuesday, March 7, at 4 00 p m., at the Union Hospital, Fall River. Subject—Anemia. Modern methods in diagnosis and treatment of blood

dyscrasias. Instructor Clark W Heath. Howard P Sawyer, *Chairman*

##### FRANKLIN

Wednesday, March 8, at 8 00 p m., at the Franklin County Public Hospital, Greenfield. Subject—Heart Disease. The treatment of 'heart attacks' or 'cardiovascular emergencies'. Instructor Francis L Chamberlain. Halbert G Stetson, *Chairman*

##### HAMPDEN

Thursday, March 9, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—Heart Disease. The treatment of 'heart attacks' or 'cardiovascular emergencies'. Instructor Francis L Chamberlain. George L. Schadt, *Chairman*

##### MIDDLESEX EAST

Tuesday, March 7, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Gonorrhea. Modern treatment of gonorrhea. Instructor George C Prather. Walter H Flanders, *Chairman*

##### MIDDLESEX NORTH

Thursday, March 9, at 4 30 p m., at St. John's Hospital, Lowell. Subject—Delivery and the Puerperium. Instructor Christopher J Duncan. William S Lawler, *Chairman*

##### MIDDLESEX SOUTH

Tuesday, March 7, at 5 00 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Subject—Bright's Disease and Hypertension. Evaluation of new therapy, diagnosis. Instructor W Richard Ohler. Alexander A Levi, *Chairman*

#### DEATHS

HARRINGTON—DANIEL J HARRINGTON, M.D., of 760 Columbia Road, Dorchester, died February 20. He was in his fifty third year.

A graduate of Harvard University in 1906, he received his degree from Tufts College Medical School in 1910. Dr Harrington was on the staff of the Boston City Hospital and the Carney Hospital and had practiced medicine in Boston for twenty nine years. He had been medical examiner for the Massachusetts Bonding Insurance Company and the Southern Indemnity Company for the past two years and had recently been active at the eye clinic of the Cambridge City Hospital.

Among his affiliations were fellowships in the Massachusetts Medical Society and the American Medical Association.

His widow, three sons, a daughter and a brother survive him.

SUPPLE—EDWARD A SUPPLE, M.D., of 385 Marlborough Street, Boston, died February 26. He was in his fifty seventh year.

Born in Holliston he graduated from Boston College in 1903 and received his degree from the Harvard Medical School in 1907. Dr Supple had served as surgeon at the Boston City, Lying in and St. Elizabeth's hospitals, and



## REPORT OF MEETING

## NEW ENGLAND PATHOLOGICAL SOCIETY

A meeting of the New England Pathological Society was held at the Evans Memorial on October 21, 1938, Dr Charles Branch presiding. Dr Leroy U Gardner, director of pathology at the Saranac Hospital, presented the paper of the evening, speaking on the subject *Silicosis*. He described the investigations carried on in his laboratory as to the pathogenesis of lesions produced by silica and its various compounds. The reaction of the lung to inhaled dusts is not necessarily fibrous in character, and the effects produced by dusts on lung tissue are not peculiar to the lung itself. Injections of dusts into any part of the body will produce lesions similar to those observed in pulmonary tissue. Intravenous injections of aqueous suspensions of dust particles were made into the ear veins of rabbits, and the changes that occurred in various organs were studied. There was a tendency for the particles to localize in the liver, spleen, lymph nodes and bone marrow, and marked reactions were observed in all these tissues. A variety of dust particles were utilized in the study: pure silica, silicates, non siliceous minerals and mixtures of silica and other minerals.

The changes occurring in the liver were cited as examples of those occurring in the other organs. Pure silica produced nodules of connective-tissue proliferation similar in appearance to tubercles, although caseation necrosis did not occur. Such nodules were formed within one month after institution of injections. After a longer time interval a laminated, hyaline nodule with an area of necrosis around its periphery was observed, and still later there was diffuse fibrosis throughout the entire organ. Colloidal silica produced relatively little reaction. There was chronic inflammation about small groups of phagocytic histiocytes, and the lesions were retrogressive rather than progressive, never resulting in fibrous tissue proliferation. The previously held belief that quartz exerted its pathogenic effect by dissolving to form silicic acid, which acted as the etiologic agent of fibrosis, is no longer tenable. Silica gel produced mild chronic inflammatory reactions which were retrogressive. Colloidal silicic acid was toxic and produced death. Amorphous silica caused some degree of fibrosis, which also tended to retrogress, although permanent changes were more marked than those produced by the gels. Diatomite produced changes which were indistinguishable from those of quartz. The degree of tissue reaction to silica was found to be inversely proportional to the size of the injected particles.

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Bismuth Subsalcylate in Oil Suspension

### Merck & Co., Inc.

Stovarsol Tablets, 0.1 gm.  
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Scopolamine Hydrobromide Merck  
Scopolamine Hydrobromide Crystals-Merck  
Scopolamine Hydrobromide Powder Merck  
Solution of Formaldehyde Merck

### National Drug Company

Antumeningococcic Serum, Refined and Concentrated

### Sharp & Dohme

Pollen Extracts-Mulford, 2 cc. vial (each cc. containing 500 pollen units)  
Pollen Extracts-Mulford, 10 cc. vial (each cc. containing 10,000 pollen units)

### The Upjohn Company

Epinephrine Powder U.S.P., 0.065 gm. (1 gr.) Upjohn  
Solution Epinephrine 1:1000-Upjohn

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## NOTICES

### ANNOUNCEMENT

MORRIS YORSHIS, M.D., announces the opening of an office at 281 Haverhill Street, Lawrence.

### PROFESSOR BEST TO LECTURE

Professor C H Best, of the Department of Physiology, University of Toronto, will speak on Recent Work on Experimental Diabetes, with Particular Reference to the Anterior Pituitary Gland at Sanders Theatre, Harvard University, on Thursday evening, March 9, at 8 15

In this talk, sponsored by the Diabetes Committee of the Massachusetts Tuberculosis League, Dr Best will discuss the new experimental diabetes, first produced by Young in London, his own contribution to that work, and his recent experiments

This fresh adventure in the etiology of diabetes is certainly the most notable since the original discovery of the cause of diabetes by Von Mering and Minkowski in 1889 The lecture is open without charge to physicians, medical students, pre medical students, nurses, and others on the personal introduction of physicians

### JOHN T BOTTOMLEY SOCIETY

A meeting of the John T Bottomley Society of the Carney Hospital Out Patient Department will be held on Tuesday, March 7, at 11 30 a m.

Dr John L Doherty will speak on Treatment of Acute Back-Strain

WILLIAM J MACDONALD, M.D., *Secretary*

### AMERICAN PHYSICIANS ART ASSOCIATION

The American Physicians Art Association, composed of members in the United States, Canada and Hawaii, will hold its second art exhibit in the City Art Museum of St. Louis, May 14 20, during the annual session of the American Medical Association Art pieces will be accepted for this art show in the following classifications (1) oils, both portraits and landscapes, (2) water colors, (3) sculpture, (4) photographic art, (5) etchings (6) ceramics, (7) pastels, (8) charcoal drawings (9) book-binding (10) wood carving, (11) metal work (jewelry) Practically all pieces sent in will be accepted There will be over sixty valuable prize awards For details of membership in this association and rules of the exhibit kindly write to Max Thorek, M.D., Secretary, 850 Irving Park Boulevard, Chicago, Illinois, or F H Redewill, M.D., President, 521 536 Flood Building, San Francisco, California

### GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the Beth Israel Hospital Auditorium on Tuesday evening, March 7, at 8 15

Dr Maxwell Finland will speak on The Present Status of the Specific Treatment of Pneumococcal Pneumonia and Other Pneumococcal Infections There will be a discussion by Drs Frederick T Lord, Edward Curnen and Mark F Lesses

LOUIS M FREEDMAN, M.D., *President*

DAVID B STEARNS, M.D., *Secretary*

### THE FOUNDATION PRIZE

The American Association of Obstetricians Gynecologists and Abdominal Surgeons announces that the annual

Foundation Prize for this year will be \$100 Those eligible include only interns, residents or graduate students in obstetrics, gynecology and abdominal surgery and physicians (M.D degree) who are actually practicing or teaching obstetrics, gynecology or abdominal surgery

Competing manuscripts must be presented in triplicate under a nom-de plume to the secretary of the association before June 1, be limited to 5000 words and such illustrations as are necessary for a clear exposition of the thesis and be typewritten (double spaced) on one side of the sheet, with ample margins

The successful thesis must be presented at the next annual (September) meeting of the association, without expense to the association and in conformity with its regulations

For further details, address Dr James R. Bloss, Secretary, 418 Eleventh Street, Huntington, West Virginia

### WEST ROXBURY MEDICAL ASSOCIATION

A meeting of the West Roxbury Medical Association will be held at Highland Hall, 1868 Centre Street, West Roxbury, on Tuesday evening, March 7, at 8 30

An illustrated lecture Interesting Case Records will be presented by Drs John J Elliott, William C Maloney, John C V Fisher and Charles J E Kickham

DAVID L. LIONBERGER, M.D., *Secretary*

### BOSTON DOCTORS SYMPHONY ORCHESTRA



Rehearsals of the newly organized Boston Doctors Symphony Orchestra, conducted by Nicolas Slonimsky, are held every Thursday evening at 7 30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open All physicians, dentists and medical and dental students who are interested should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430)

### BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, March 8 at 12 o'clock noon, in the Pathological Amphitheater

JOSEPH E. HALLISEY, M.D., *Secretary*  
Medical Staff

### SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, March 21, at 12 o'clock noon Dr Halsey B Loder will speak on Neglected Gall Bladder Disease.

Physicians are cordially invited to attend

JOHN B HALL, M.D., *Secretary*

### BOSTON LYING IN HOSPITAL

The next Journal Club meeting of the Boston Lying in Hospital will be held on Wednesday, March 15 at 8 30 p m

## SYMPOSIUM ON PLACENTATION

Presentation of Six Human Presomite Embryos Dr John I Brewer, Northwestern University Medical School, Chicago, Illinois Discussion by Dr George B Wislocki and Dr Arthur Hertig

Physicians and students are cordially invited to attend  
DUNCAN E REID, M.D., Secretary

## AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The next annual meeting of the American Association for the Study of Goiter will be held in Cincinnati Ohio May 22, 23 and 24 The program for this meeting will consist of scientific papers dealing with goiter and other diseases of the thyroid gland, dry clinics conducted by guests of the association and operative clinics in the various hospitals in Cincinnati.

The Van Meter Prize Award of three hundred dollars and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland will be made at this meeting, provided essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations should not exceed three thousand words in length must be presented in English and a typewritten double spaced copy sent to the corresponding secretary, Dr W Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than April 15 The committee that will review the manuscripts is composed of men well qualified to judge the merits of the competing essays.

A place will be reserved on the program of the annual meeting for presentation of the Prize Award Essay by the author if it is possible for him to attend The essay will be published in the annual proceedings of the association. This will not prevent its further publication however, in any journal selected by the author.

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, March 9 in the amphitheater of the Peter Bent Brigham Hospital, Dr Robert T Monroe associate in medicine, Harvard Medical School and physician Peter Bent Brigham Hospital will give a medical clinic Practitioners and medical students are cordially invited to attend

## TUMOR CLINIC BOSTON DISPENSARY

Each Tuesday and Friday morning 10 00 to 12 30 there is a meeting of the Tumor Clinic of the Boston Dispensary a unit of the New England Medical Center Neoplasms of various sorts are seen and discussed and when there is an indication are treated with radium of high voltage x ray Physicians are invited to visit this clinic They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician A limited number of beds are available for diagnostic study and for treatment.

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY MARCH 6

## MONDAY MARCH 6

- 4 p m Physicians and medical students are cordially invited to attend a clinic presented by the medical surgical and orthopedic services of the Infants and Children's hospitals, in the amphitheater of the Children's Hospital
- 5 p m Edward K Dunham lecture Harvard Medical School amphitheater Building C

## TUESDAY MARCH 7

- 9-10 a m Joseph H Pratt Diagnostic Hospital Diagnosis and Treatment of Certain Bone Tumors. Dr J D Adams
- 10 a m 12 30 p m Tumor clinic Boston Dispensary
- 11 30 a m John T Bottomley Society Carney Hospital Out Patient Department
- 8 15 p m Greater Boston Medical Society Beth Israel Hospital auditorium
- 8 30 p m West Roxbury Medical Association Highland Hall 1865 Centre Street West Roxbury

## WEDNESDAY MARCH 8

- 9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- 12 m Clinicopathological conference. Children's Hospital amphitheater
- 12 m Boston City Hospital Monthly clinicopathological conference. Pathological amphitheater
- 5 p m Edward K Dunham lecture Harvard Medical School amphitheater Building C

## THURSDAY MARCH 9

- New England Hospital Association. Hotel Statler
- 8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Surgical
- 9 10 a m Joseph H Pratt Diagnostic Hospital Laboratory Aids in the Detection of Gonococcus Infection. Dr W A Hinton
- 3 30 p m Medical clinic at the Peter Bent Brigham Hospital
- 8 15 p m Professor Best to Lecture. Sanders Theater Harvard University

## FRIDAY MARCH 10

- New England Hospital Association. Hotel Statler
- \*9 10 a m Joseph H Pratt Diagnostic Hospital Functional Disturbances of the Gastrointestinal Tract Dr J H Means
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 5 p m Edward K Dunham lecture. Harvard Medical School amphitheater Building C

## SATURDAY MARCH 11

- New England Hospital Association Hotel Statler
- 9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY MARCH 12

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Arthritis Causes and treatment. Dr Lloyd T Brown
- 4 p m Free public lecture. Harvard Medical School Amphitheater of Building D Hazards in the Modern Home. Dr Timothy Leary

Open to the medical profession

MARCH 5—Health Lecture Quincy City Hospital Page 363 issue of February 23

MARCH 5—Lecture at the Faulkner Hospital Page 971 issue of December 15

MARCH 5—Free Public Lecture Harvard Medical School Page 1056 issue of December 29

MARCH 5—Beverly Hospital Public Health Lecture. Page 1056 issue of December 29

MARCH 5—Salem Hospital Public Health Lecture Page 126 issue of January 19

MARCH 6 8 and 10—Edward K. Dunham Lectures Page 763 issue of February 23

MARCH 7—John T Bottomley Society Page 404

MARCH 7—Greater Boston Medical Society Page 404

MARCH 7—West Roxbury Medical Association Page 04

MARCH 8—Boston City Hospital Monthly clinicopathological conference Page 404

MARCH 9—Medical clinic at the Peter Bent Brigham Hospital Note above.

MARCH 9—Professor Best to lecture Page 404

MARCH 9—Pediatric Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill

MARCH 9 11—New England Hospital Association Page 767 issue of February 9

MARCH 13—Fourth Annual Postgraduate Institute Page 933 issue of December 8

MARCH 15—Boston Lying in Hospital Page 404

MARCH 15 AND 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19

MARCH 21—South End Medical Club Page 404

MARCH 21—American College of Physicians Page 36 issue of July 7

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 14 0—American Physicians Art Association Page 404

MAY 15-16—American Board of Obstetrics and Gynecology In Page 215 issue of February 2

- MAY 15 19—American Medical Association St Louis Missouri  
 MAY 22 23 and 24—American Association for the Study of Goiter  
 Page 405  
 JUNE 6 7 8—Massachusetts Medical Society Worcester  
 JUNE 12 17—Symposium on the Public Health Significance of the Virus  
 and Rickettsial Diseases Page 125 issue of January 19  
 JUNE 26-29—National Tuberculosis Association Page 936 issue of  
 December 8  
 SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of Septem-  
 ber 22  
 SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology  
 Page 938 issue of December 8  
 SEPTEMBER 15 28—Pan Pacific Surgical Association Page 863 issue of  
 November 24  
 FALL 1939—Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

- APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m  
 Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy  
 MAY 10—Annual meeting Salem Country Club Peabody

### SUFFOLK

- MARCH 29—Joint meeting with New England Pediatric Society Boston  
 Medical Library 8 15 p m Program and speakers to be announced

- APRIL 26—Annual meeting in conjunction with Boston Medical Library  
 at 8 15 p m Election of officers Program and speakers to be announced

### WORCESTER

- MARCH 8—Page 362 issue of February 23  
 APRIL 12—Worcester Hahnemann Hospital  
 MAY 10—Worcester Country Club—Annual meeting

With the exception of the annual meeting in May all the meetings begin  
 with a supper at 6 30 p m which is followed at 7 30 p m by the  
 business and scientific sessions

## BOOK REVIEWS

*The 1938 Year Book of Physical Therapy* Edited by Rich-  
 ard Kovacs 486 pp Chicago The Year Book Pub-  
 lishers, Inc., 1938 \$2.50

This is the first year book on physical therapy to be pub-  
 lished and as such will be welcomed by those interested in  
 this special field of medicine. It gauges the progress made  
 by clinicians and men of research, as is reflected in the  
 abstracts of papers published here and abroad. Some pa-  
 pers go a step farther by forecasting progress. Thus one  
 states 'A yeast culture increases its fermentation in the  
 positron ray and stops in the electron ray. The behavior  
 of bacteria is similar. The fact that the course of a  
 chemical process can be retarded or accelerated at will with  
 electron or positron radiation points to the possibility of the  
 control of pathologic metabolic processes and of the capil-  
 lary circulation at the site of the disease.'

Another paper describes the role played by the Council  
 on Physical Therapy in reporting on the value and merit  
 of all therapeutic and certain diagnostic apparatus and con-  
 trivances offered for sale to physicians and hospitals.

Short wave diathermy is introduced by an editorial state-  
 ment in regard to the various claims which have been  
 made by different observers concerning the mode of action  
 of this therapeutic measure. These include thermic, ather-  
 mic, bactericidal and selective effects. Evidence pro and  
 con in regard to these claims is presented in the abstracts.  
 These also contain detailed statements with regard to  
 dosage, technic of application and choice of apparatus.

Artificial fever therapy is taken up. The physiopatho-  
 logical aspects of this form of treatment are discussed, to  
 be followed by a paper entitled 'Posology of Therapeutic  
 Fever,' in which are discussed the nature, intensity, dura-  
 tion and frequency of induced fever therapy. The various  
 cabinets which are employed in the administration of this  
 treatment are described, and illustrated by cuts.

Under the general heading of 'Light Therapy' we find  
 papers on heliotherapy and ultra violet light radiation. The  
 quartz mercury and carbon-arc lamps are described and

illustrated. There is a great variety of papers dealing with  
 such phases of the subject as 'Histamine Content of the  
 Skin after Ultra-Violet Radiation,' 'Effects of Ultra Violet  
 Rays and Visible Rays on Carbohydrate Metabolism,'  
 'Effects of Heliotherapy on Osteogenesis,' 'Clinical Ap-  
 plications of Ultra-Violet Ray on Wound Healing and  
 'Ultra-Violet Air Sterilization.'

The second part of the book deals with the treatment  
 of various pathologic conditions by the physical agents de-  
 scribed in the first part.

This first attempt has proved that there is sufficient  
 worthwhile material accumulating to encourage the con-  
 tinuance of such a publication.

*Les Syndromes d'Imprégnation Tuberculeuse* Rene Bur-  
 nand. 136 pp Paris Masson et Cie, 1938 244  
 Fr fr

This is a provocative little book in which the author  
 classifies and studies various forms of vague, fickle and  
 generally unrecognized manifestations of a latent type of  
 tuberculosis. He claims that the disease, instead of local-  
 izing in a particular organ, masquerades for years, in cer-  
 tain instances for a lifetime, under the colorless and loose  
 fitting mantle of various clinical entities, such as chronic  
 erythema, sarcoid, acne, acrocyanosis, chilblains, some types  
 of chronic rheumatism, localized or diffuse cellulitis, mul-  
 tiple sclerosis and vague psychopathies.

The author studied three main entities. He describes  
 first a migrating type of chronic miliary tuberculosis,  
 'passing from one organ to the other, often from one se-  
 rous membrane to the other, and disappearing spontane-  
 ously without leaving any important sequelae.' Then  
 comes the state of chronic bacillosis with subnormal tem-  
 peratures for months and years, chronic invalidism, ab-  
 sence of any permanent important, localized tuberculous  
 focus sufficient to explain the general condition, and a  
 marked predominance among women. Assumption of the  
 etiology is based on tuberculous antecedents and a strong-  
 ly positive tuberculin reaction. The third and last group,  
 the author calls *patraques*, which means a machine  
 which functions badly because it is poorly built or worn  
 out. These patients differ from those of the preceding  
 category. Their state is more stabilized. The symp-  
 tomatology lacks precision, it assumes the various clinical  
 pictures resulting from a lack of equilibrium of the main  
 systems and may be mistaken for a dysfunction of any of  
 them. These are cases of constitutional debility that are  
 physically below par from birth, remain so all their lives,  
 and never look or feel well, yet, there are rarely if ever  
 any definite positive findings. The symptoms are vague,  
 and the examinations and tests unsatisfactory. The com-  
 plaints vary from day to day and cover a wide range—  
 thoracic pains, digestive disturbances, abdominal discom-  
 fort, constipation, migraine, insomnia, nervousness, de-  
 pression, and so forth.

Intelligent management and proper treatment can do a  
 good deal in a certain percentage of cases. Psychotherapy  
 comes first. Symptoms are dealt with as they arise. The  
 physician must aim to build up those patients by all the  
 resources that hygiene, exercise and diet put at his dis-  
 posal. Sanatorium treatment has little to offer, gold salts  
 less. The author claims to have obtained good results  
 with tuberculin injections which are continued for six to  
 eight months.

This book opens attractive avenues of speculation which  
 any internist should be glad to follow. He may find  
 among them some helpful suggestions to meet with more  
 equanimity and better understanding some of his trying  
 cases of chronic disease.



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## THE CLINICAL EFFECT OF COLLOIDAL ALUMINUM HYDROXIDE ON PATIENTS WITH PEPTIC ULCER\*

ROBERT B. RUTHERFORD, M.D.<sup>†</sup> AND EDWARD S. EMERY, JR., M.D.<sup>‡</sup>

BOSTON

THE most difficult problem which confronts the practitioner today in the treatment of patients with peptic ulcer is that of deciding as to the severity of the disease. This condition, like arthritis and many other chronic ailments, varies astonishingly in its intensity. From 40 to 50 per cent of the cases prove to be mild and do not require more than a simple form of therapy. Thirty to 40 per cent are only moderately severe and are controlled by a moderately strict regime. This leaves 15 to 20 per cent of the cases which tax the physician's skill to the utmost, because they respond unsatisfactorily to ordinary procedures, both medical and surgical. Alkalies are usually ineffective in neutralizing the gastric juice sufficiently for them to be of any value, and frequently have to be stopped because of the development of alkalosis. The less radical operations, such as gastroenterostomy and partial resection, frequently leave the patient worse than before because of the formation of jejunal ulcers. These results are so unfortunate that one of us (E. S. E. Jr.<sup>1</sup>) in 1934 cautioned against the use of surgery, and suggested that it was better to do the best one could with prolonged rest and frequent feedings, since the results, although admittedly unsatisfactory, were better than the complications following the usual surgical procedures. In recent years there has been an attempt to solve the problem by radical surgery, with the result that an increasing number of gastric resections are being performed. However, this solution is not altogether satisfactory. There is no gainsaying that many patients on whom a large resection has been done suffer from unpleasant symptoms caused by the overburdening of the upper intestine with food. Epigastric distress of varying degrees, weakness, and

faintness after meals are some of the sequelae. Dilatation of the jejunum and looseness of the bowels may occur. Moreover, information on the final results of this operation is too meagre for us to forecast ultimate results. We have had 3 cases of gastric resection at the Peter Bent Brigham Hospital in which jejunal ulcers developed. Even radical surgery leaves much to be desired in the handling of severe cases.

In view of this unsatisfactory state of affairs, we have been led to investigate the possible value of aluminum hydroxide in the treatment of severe cases, and wish to report on the clinical results which we have had with it to date. We<sup>2</sup> have previously reported its effect on the gastric juice. It is known to be an effective antacid, and is free from the disadvantages of absorbable alkalies, which may produce alkalosis.<sup>3</sup>

The latter quality should be of the greatest value in treating severe cases characterized by an excessive secretion of hydrochloric acid. The experimental work of Mann and Williamson<sup>4</sup> has shown that this acid bears an important relation to peptic ulcer. One of us (E. S. E. Jr.<sup>5</sup>) has already emphasized the value of temporarily inhibiting a hypersecretion by x-ray. If the reported effect of aluminum hydroxide on secretion can be confirmed, the acidity can be more effectively controlled by this drug than by the more familiar alkalies. During the day the very severe case secretes large quantities of gastric juice with a high concentration of acid, and this process continues at night, long after the stomach has emptied itself of food (an abnormality characteristic of patients with ulcer). The usual ulcer regime which is designed to neutralize the acid by means of frequent feedings and alkaline powders, is unsatisfactory in many patients with hypersecretion. Owing to the large amounts of alkali required to neutralize the excessive secretion of acid, alkalosis is a frequent complication, particu-

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larly when the usual sodium and calcium powders are used. The stomach responds to them by an increased secretion, and a vicious cycle develops. The more alkali the greater is the secretion, until a point is reached where the onset of alkalosis compels discontinuance of the powders. Even if it is possible to neutralize the secretion during the day, it is frequently impossible to overcome the night secretion, the seriousness of which is not always fully recognized. But the fact is that ulcers do not heal in the presence of a night secretion, even though the gastric juice is neutralized during the day.

The properties of colloidal aluminum hydroxide should make it an ideal preparation for controlling hypersecretion. The amount of the drug that can be prescribed is not limited by the possibility of alkalosis. Therefore, sufficient quantities can be given to neutralize all the acid. The drug may be allowed to drip into the stomach continuously through a tube,<sup>7</sup> so that neutralization can be maintained throughout every day and night from the very beginning of treatment. If the drug inhibits the secretion of acid, the complication of night secretion should be easily overcome.

#### MATERIAL AND METHODS

We chose for this study only the severe cases which had proved refractory to previous medical or surgical treatment or both. We treated 28 patients. Eighteen of these were admitted to the wards of the Peter Bent Brigham Hospital, 10 were treated in the Out-Door Department and were ambulatory throughout their treatment. Sixteen patients represented the severest type of the disease, while 12 were classified as moderately severe. In 15 of the severest cases there was excessive hypersecretion, and in 12 of these the symptoms were never controlled satisfactorily, following one or more treatments on the hospital wards with the usual Sippy regimen. Four patients, who for economic or social reasons had never been hospitalized, had not responded to ambulatory treatment. Four of the severe cases had suffered previous perforations, 1 of these had experienced a perforation from a gastric ulcer and later one from a duodenal ulcer. One patient had had sixteen hospital admissions. Five had had previous surgery, in 2 cases this was followed by jejunal ulcers, and in 3 by continued severe pain. One of the severe cases was complicated by nephrolithiasis, which limited the amount of absorbable alkalis that could be used. The 12 moderately severe cases were so classified either because symptoms continued during an otherwise satisfactory ambulatory treatment, or because treatment with alkali-

line powders was considered inadvisable. Four of these patients had developed alkalosis previously while taking only a moderate amount of ordinary alkalis, and 2 suffered from renal calculi.

The following procedure was carried out in all cases. A gastric analysis was performed before starting the aluminum hydroxide. This consisted of a fractional study after an alcohol test meal. Following the completion of this test, histamine was given routinely and continuous drainage was instituted for one hour, in order to determine the quantity of juice secreted in response to the chemical stimulation. After satisfactory tests of the gastric juice had been completed, the patients who had been hospitalized were started on a continuous drip of colloidal aluminum hydroxide. The preparation which was used is known as Creamalin\*. One part of the aluminum hydroxide to three parts of water was used, and the mixture was allowed to drip into the stomach at the rate of approximately 15 drops per minute. In addition to the antacid the patients received 90 cc. of equal parts of milk and cream every hour, and supplementary feedings were gradually introduced until by the end of the first week six small meals were being taken. The drip was continued day and night for a week, at the end of which it was omitted for twenty-four hours and another gastric analysis was performed. If at this time the patient's gastric acidity had not been reduced markedly, the drip was continued for several more days. When it was finally discontinued, the patients were given 60 cc of diluted aluminum hydroxide every hour from 8 a m to 9 p m and the six small feedings were changed to three moderate-sized meals. The procedure in the ambulatory cases was similar to that of the hospital cases except that the drip treatment was omitted. These patients were seen at weekly intervals, for the most part, for from three to nine months. At each visit a gastric analysis was performed, and the amount of aluminum hydroxide was gradually reduced, so that by the end of three months the patients were receiving 90 cc before each meal and at bedtime.

#### RESULTS

All the patients in this series who received drip therapy, and all except 2 of those receiving ambulatory treatment, were relieved of their distress within twenty-four hours and had no recurrence of pain during the rest of the treatment. Some of the patients who had received the usual Sippy treatment reported that their stomachs felt "easier" under the aluminum hydroxide therapy than with

Supplied through the courtesy of the Cleveland Chemical Association, Cleveland, Ohio, and later of the Alba Pharmaceutical Company, Inc., New York City.

alkaline powders (Several patients not included in this series refused the treatment because they objected to the tube or to the taste of the drug.) We also found that aluminum hydroxide decreased the titratable acidity of the gastric juice. The highest free acidity after the alcohol test meal dropped from an average of 68 before treatment to approximately 35 after treatment. The total acidity followed the free acidity in all cases. There was a similar drop in the acidity of the fasting contents and of the gastric juice secreted in response to histamine. Our experience showed that usually a week was required for the acid to reach its lowest level, and that a continuance of the drip beyond this time caused little further decrease in the titratable acidity. Patients who were given aluminum hydroxide by mouth reached the same low level after a somewhat longer period. Frequent aspirations of the stomach during the day and at midnight showed that there was no free hydrochloric acid in the stomach while the patient was being given aluminum hydroxide.

#### DISCUSSION

Our experience with this series has convinced us that it is possible to secure and maintain complete neutralization of gastric acidity if colloidal aluminum hydroxide is given in large enough amounts. The evidence which we have to date indicates that this is an easy way to obtain quick relief in patients with severe ulcer symptoms. The patient soon becomes accustomed to the small nasal tube and is able to eat and sleep without discomfort. The present evidence also suggests that this method may be a valuable aid in the treatment of patients with hypersecretion or night secretion or both. The rapid relief from pain throughout the twenty-four hours ensures for nervous patients an opportunity to relax, and since the patients in most of the severe cases are nervous, this is an important consideration. The drip method ensures at the earliest moment the three requisites for healing, namely physical rest, nervous relaxation and neutralization of gastric acidity. The inhibitory effect which the drug has on the secretion of hydrochloric acid should also decrease the harmful influence of hypersecretion. However, there are a number of different factors that have to be considered in this connection, and we have formed no definite opinion.

The question naturally arises why the aluminum hydroxide decreases the titratable acidity. We studied histologically the mucous membranes of 2 patients who had been receiving the drip for four days and for three weeks, respectively. No abnormalities were observed microscopically. Fur-

thermore, the data presented by others give no contraindications to the use of aluminum hydroxide so far as its absorption and its effect on other organs are concerned. Another point of interest is the length of time for which the decreased acidity can be maintained. We have not yet accumulated sufficient data to answer this question. However, the evidence so far gathered shows that there is a tendency for the acidity to start rising shortly after the continuous drip is stopped. Further time is needed in order to determine whether it is possible to prevent a return to pretherapeutic levels by the administration of quantities of the drug which are practical over long periods of time.

The types of patients for whom aluminum hydroxide is recommended are as follows:

Those with peptic ulcer of an obviously severe type and with marked hypersecretion (This method brings them under control more rapidly and more completely than does any other.)

Those who have not responded well to the usual medical treatment but have not yet been submitted to surgery.

Those with a postoperative jejunal ulcer which has responded less well to therapy than did the original ulcer (The 2 patients of this type in the present series appeared to do better with aluminum hydroxide therapy than with alkaline powders.)

Those with peptic ulcer associated with nephrolithiasis (The use of aluminum hydroxide makes it possible to treat the ulcer without danger of intensifying the renal difficulty.)

#### SUMMARY AND CONCLUSIONS

We treated 28 patients with severe peptic ulcer by colloidal aluminum hydroxide. This was given orally or by a combination of a continuous drip and the oral method for three to nine months. It was found that the gastric contents were completely neutralized. Relief of pain occurred within twenty-four hours. The drug and the method of treatment were agreeable to the majority of patients. The drug apparently did not alter the body chemistry.

It is suggested that this form of treatment is advantageous in cases which do not respond well to the usual medical treatment because of a hypersecretion or night secretion, in cases complicated by nephrolithiasis, and in patients who develop alkalosis while receiving alkaline powders.

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## PAINLESS ACUTE INFARCTION OF THE HEART\*

ANDREW M BABEY, M.D.†

BROOKLYN, NEW YORK

SINCE Herrick<sup>10</sup> first emphasized in this country the frequency and classic features of coronary occlusion, this disorder has been a topic of unusual appeal to many workers. A vast amount of clinical and experimental observation has gradually made for a better understanding of the disease. Pain as a symptom of acute infarction possesses a very special interest, for it is by a study of its severity, site and radiation that one is most often led to make the correct diagnosis. It is therefore not a little surprising to find a great difference of opinion in the literature regarding this important presenting symptom.

Obrastzow and Straschesko<sup>20</sup> were among the first to point out that acute infarction of the heart could be painless. Since then, many have confirmed the fact.<sup>28</sup> More recently, efforts have been made to go farther and determine the relative incidence of painless and painful attacks. Parkinson<sup>21</sup> and Wolferth<sup>27</sup> believe that acute infarction without pain is very rare. Howard<sup>13</sup> found that in 6 per cent of a large series the patients had had no pain during their attacks. Davis,<sup>5</sup> who studied 76 case reports of old and recent infarcts, found no record of pain in 38 per cent. Saphir et al<sup>23</sup> discovered a similar percentage in their 34 cases. Boyd and Werblow,<sup>2</sup> after questioning over 100 consecutive patients with coronary thrombosis, stated that 33 per cent had had no pain. Kennedy<sup>15</sup> reviewing 200 necropsies and clinical histories, found that only 40 per cent of the cases with acute infarction had experienced no pain, while in 22.5 per cent of old healed infarctions no note of pain was made. Bean<sup>1</sup> examined 300 protocols and found a record of pain in only 72 per cent of acute infarctions, in about 25 per cent of all the cases, painless and painful, there was some clouding of the sensorium.

The fact of painless infarction having been established, there appeared some interesting speculation regarding the cause of this unusual phenomenon. Wearn,<sup>26</sup> Hamman,<sup>6, 7</sup> and Parkinson

and Bedford<sup>22</sup> state that when infarction supervened in a case with pre-existing signs and symptoms of heart failure, pain might be absent. Bruenn, Turner and Levy,<sup>3</sup> on the other hand, believed that those patients with no symptoms prior to the acute episode were most likely to have no pain associated with the thrombosis. Libman,<sup>16</sup> Carr,<sup>4</sup> and Keefer and Resnik<sup>14</sup> emphasized the alleged hyposensitivity of these patients. Davis<sup>5</sup> explained his cases by assuming an absolute rather than a relative ischemia of heart muscle at the time of infarction. Hay<sup>8, 9</sup> thought pain was likely to be absent in second and third attacks. Mullen<sup>19</sup> and Sutton<sup>24, 25</sup> were inclined to believe that painless attacks had some correlation with slowness of closure or smallness of vessels involved. Herrick<sup>11, 12</sup> thought certain areas of the heart were silent or less sensitive than others, or possibly that a gradual narrowing of an artery by sclerosis slowly destroyed vessels, nerves and functioning muscles, causing anesthesia in this part, so that a final complete obstruction came without a sudden shock—the heart being in a sense prepared for the supreme insult. Hochrein and Seggel<sup>28</sup> believed diabetic patients to be more prone to painless thrombosis.

From this brief review, it is obvious that there is great uncertainty not only about the cause of painless attacks but also about their incidence. This study was undertaken to obtain information only about the latter. It limits itself to acute infarcts diagnosed beyond question by characteristic serial electrocardiograms as well as clinical picture. All records were kindly placed at our disposal by the Electrocardiographic Department at Kings County Hospital.

Every case was seen by the writer as soon as possible after the diagnosis was established and a careful, unbiased history was taken. Whenever necessary the help of an interpreter was obtained. By direct questioning in each fresh case we hoped to avoid the difficulty which all previous writers, except Boyd and Werblow,<sup>2</sup> had encountered, namely the hazardous necessity of relying on statements recorded by people who might

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not have fully investigated each individual aspect of pain Libman's<sup>17</sup> styloid-process-pressure test to determine the presence or absence of sensitivity was used in many cases

Two objections promptly come to mind in such a study Have not certain mild, atypical cases escaped notice? Inasmuch as one or more electrocardiographic records are taken at Kings County Hospital on the slightest suspicion of abnormal heart action, it seems fair to state that this criticism is probably invalid The other objection is more difficult to surmount, for it depends, in part at least, on one's own interpretation of pain To overcome this, certain "criteria of pain" were laid down at the start, and when a patient experienced any one of these he was considered to have experienced a painful attack, though at times the patient himself might describe his sensation as "not exactly a pain" These standards were a burning, choking, bursting or boring sensation, squeezing, tightness or pressure, soreness, aching, numbness, simple heaviness or that associated with an obstructing lump, or a knifelike, sharp pain (uncommon)

Patients who died very suddenly before complete study, or those who were too sick to question and died soon after admission, were excluded, as were those who suffered infarction during operation or when barely out of anesthesia<sup>18</sup> Whenever the mental state was clouded on admission by uremia or impending coma and no reliable history was obtainable, the cases were considered unsatisfactory and omitted A small number of patients (5) had very bizarre or atypical electrocardiograms, particularly bundle-branch block Although the clinical history and rapid changes in electrocardiographic records indicated that these patients must surely have suffered an acute infarction, such cases were deliberately excluded, but all had pain at onset

In all, 116 cases were questioned and included in this study, and only 1 had painless infarction A summary of this case follows

L. M., a 43-year-old Jewish tailor, was admitted to the Kings County Hospital June 23, 1938, complaining of fainting after a sudden dizzy spell. A short time before entry he was sitting quietly in a chair when he suddenly became dizzy and fell to the floor unconscious. He was brought to the hospital by ambulance in a semistuporous state. Three years before admission he had had a severe substernal and precordial tightness, which his local doctor said was a heart attack. The patient stayed in bed about 6 weeks, after which he was apparently well, except for occasional attacks of angina pectoris on exertion. No electrocardiogram was taken at that time.

Physical examination on admission revealed a semistuporous male complaining of headache. There was no noticeable dyspnea, orthopnea or cyanosis. The blood pressure was 100/70. Moist rales were present at both

bases. The heart sounds were of poor quality, the rhythm was regular. No murmurs were heard. The abdomen was slightly tender in both the right upper and right lower quadrants. No peripheral edema was noted. Moderate pressure over the styloid process caused pain. A blood Wassermann test was negative, the urine showed many pus cells, which were interpreted as due to kidney infection, the patient having been operated on 2 years before for renal stone. Three electrocardiograms taken during the next month showed a T<sub>3</sub> type of infarction with progressive changes. The patient left the hospital against advice after 1 month of bed rest.

Despite the number of papers stating that it is rather common, painless acute infarction of the heart is, in our experience, a rarity. Almost all reports which declare it to be frequent are based on old case records which can be very misleading. As Wolferth<sup>27</sup> has stated, patients who have suffered a coronary closure weeks or months before may have had such mild pain as to have completely forgotten about it. Questioning all acute cases soon after the attack is the only safe approach. Yet even this is liable to error, for patients occasionally suspect the nature of their attack and deny typical pain out of fear of being told the truth,<sup>-1</sup> or their distress may not be classical and be entirely overlooked.

#### SUMMARY

One hundred and sixteen patients with acute myocardial infarction admitted within the last year to Kings County Hospital were carefully questioned soon after their attacks, and, according to criteria set down in this paper, only 1 was found not to have had pain. Furthermore, this patient gave a history suggesting strongly that three years before he had had a coronary occlusion with pain, and he reacted with pain to Libman's test for sensitivity.

The more important literature is reviewed and discussed.

510 Eighth Avenue.

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## A NEW METHOD OF STRAPPING FOR BACK STRAIN WITH SCIATICA\*

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BOSTON

**T**HIS report of a new method for treating back strain with sciatica is presented for consideration. The simplicity of the method and the prompt relief of pain in suitable subjects seem to warrant its further application.

The procedure was first considered in a patient with sciatica who volunteered the information that his pain was alleviated by walking with the leg in external rotation. This suggested that the pain might be due to spasm of the piriformis muscle. Consequently when, five months ago, a patient with pain in the lower back radiating down the leg was examined, a method of strapping the thigh and back with adhesive tape was devised to relieve tension on the muscles involved in the disability, namely the tensor fasciae latae, gluteus maximus and piriformis. The immediate relief of pain in this case led to its application to other patients.

### METHOD

The treatment consists of relieving the tension on these hip muscles by transferring the strain to the lower back by means of strips of adhesive tape applied along the thigh and back. It is very important to have the patient in the correct position

The subject lies on the unaffected side with the back toward the examiner (Fig 1). The legs are flexed 30 or 40 degrees, with the knees at a right angle, and several pillows are placed between the thighs to bring the upper or affected leg into 20 or 30 degrees of abduction and 20 or 30 degrees of external rotation. Three layers of adhesive tape

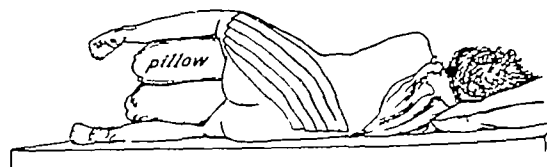


Figure 1

*Longitudinal strips of adhesive tape are placed on the thigh, hip and back, with the leg in 30 degrees of abduction, 40 degrees of flexion and 20 degrees of external rotation.*

are then applied. The first layer consists of long strips of 2-inch tape, as shown in the illustration. These are placed beginning 8 cm above the knee and about 5 cm from the middle of the anterior thigh. They are brought upward on the thigh, over the crest of the ilium 5 cm posterior to the anterior superior iliac spine, and continued onto the small of the back across the midline, as far superiorly as the twelfth dorsal vertebra. Similar

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overlapping longitudinal strips are laid on the thigh, crossing the buttock and sacrum onto the lumbar region of the back, until the whole of the lateral thigh is covered. From below upward, transverse pieces of adhesive tape are fastened over the longitudinal strips covering the thigh, hip and lower back (Fig 2). A third layer of tape is

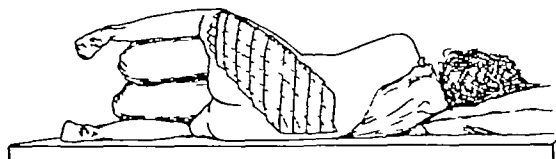


Figure 2

*From below upward transverse pieces of adhesive tape are fastened over the longitudinal strips covering the thigh, hip and lower back*

placed similar to the first longitudinal layer (Fig 3). The leg is thereby strapped in abduction, flexion and external rotation, relieving the tension on the muscles involved in these actions, that is the tensor fasciae latae, gluteus maximus, and piriformis.

There has been no emphasis on aftercare except to advise the patients to refrain from heavy lifting or hard work. They have thus been kept ambulatory without the benefit of heat, salicylates, bed board or corset, in order to reach an estimate of the worth of this therapy uncomplicated, so far as possible, by other factors. The tape is removed after five to seven days. If the patient is symptom-free, no other treatment has been given except exercises for stretching the fascia lata. Should the Ober<sup>1</sup> or Ely<sup>2</sup> test on the opposite leg also be positive, and so give evidence of contracture of the fascia lata, or, should there be pain on internal rotation of the leg in the prone position, suggesting spasm of the piriformis muscle, that side may be treated in a similar fashion. In order to follow the progress of our patients and to measure the amount of contracture or tension on the fascia lata, the distance between the table and the knee was measured in the Ober test, similarly the distance between the buttock and heel was noted in the Ely test.

#### SELECTION OF CASES

Since this treatment is designed to relieve spasm of certain muscles only, it is important to select only those subjects in whom these structures appear to be involved. Patients with low back pain or sciatica are suitable subjects if they exhibit a positive Ober or Ely sign or pain on internal rotation of the leg in the prone position. Our patients were examined according to the method described by Smith-Petersen.<sup>3</sup> In half the cases roentgenographic studies were made. Lumbar punctures or lipiodol studies of the spine were not done. The

method has been used on 11 patients, with excellent results in 5, and considerable relief in the remainder. The following are representative case histories.

**Case 1** A 60-year-old housewife was seen in the Out-Patient Department in July, 1938, complaining of pain of 2 weeks' duration in the right sacroiliac region, radiating down the posterior aspect of the right thigh into the calf. Bed rest and ordinary back strapping had failed to relieve the pain. There was no history of trauma.

Examination showed a well-developed and moderately

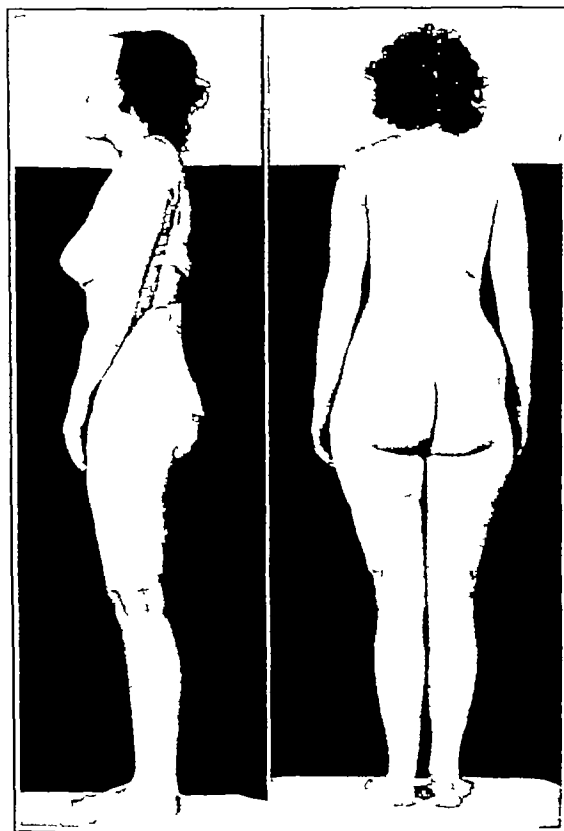


Figure 3

*Photographs showing adhesive strapping applied to relieve strain on the tensor fasciae latae, gluteus maximus and piriformis muscles. In the upright position, the anterior portion of the tape is tight, relieving strain on the tensor fasciae latae.*

obese woman. Flexion of the back while standing was limited to 20°. There was tenderness over the right posterior superior iliac spine. Straight leg raising on the right was limited to 45° by the onset of back pain. The Ober test on the right was positive. A diagnosis of back strain and sciatica due to contracted fascia lata on the right was made. It was believed that the underlying lesion was a spasm of the tensor fasciae latae, gluteus maximus and piriformis muscles. Accordingly the leg was strapped with adhesive tape in the manner described. There was immediate relief of both back and leg pain.

**Case 2** A 54-year-old retired business man was seen on July 12, 1938, with a complaint of pain in the small of the back of 4 years' duration. The pain had developed after a long automobile ride and was localized in the lumbo-

sacral region. At the time of onset, the patient had been unable to move and had had to remain in bed for a week. He had not recovered completely from this acute attack, and in spite of heat, massage, exercise, chiropractic manipulation and a sacroiliac belt the pain had remained, but it did not incapacitate him.

Examination showed a well-developed and nourished man in no acute distress. On standing, his back showed a marked left scoliosis. The lumbosacral joint and the left posterior superior iliac spine were tender. The back motions were good. The hip motions were normal, except that rocking the pelvis with the knees flexed caused pain. The tensors were contracted. The patient was advised to wear a lumbosacral corset, sleep on a board and have baking and massage twice a week.

He showed no improvement under this regime. On September 15 the right thigh was strapped with adhesive tape. The patient "felt better immediately." The strapping was removed after 4 days. The right knee could then touch the table in the Ober test, while the left lacked this ability by 8 cm. The left thigh was strapped with adhesive tape. Five days later the tape was removed and the patient was given exercises for stretching the tensor fasciae latae muscle. Examination showed both tensors to be relaxed. The patient was again seen on October 11, when he felt '80 or 85 per cent better.' He had some residual pain in his back, but he said that it was less intense and that it did not bother him.

**Case 3** An 18-year-old nurse complained on November 1, 1938, of moderate backache and severe pain in the lateral aspect of the left thigh of 2 days duration. The evening before the onset of the pain she had slipped and fallen down six steps. The pain was so severe that she lumped. Examination showed localized tenderness over the lateral aspect of the left mid thigh. An x ray of the left hip and upper four fifths of the femur was normal. The patient was seen 2 days later, still complaining of pain in the small of the back and severe pain in the lateral aspect of the thigh. The lumbosacral and left sacroiliac regions were tender. There was no restriction of back motion. The straight leg-raising test was normal on the right, but was limited to 45° on the left. It was thought that the thigh pain was due to back strain. Consequently an ordinary adhesive strapping was applied to the back.

The patient returned on November 10. The back strapping had relieved her backache, but had failed to alleviate the pain in the left thigh. Examination showed a well-developed and nourished young woman with good posture. She walked with a left limp. Palpation of the back was negative. Motions of the back in the standing position were normal. The hip motions were as follows:

	RIGHT	LEFT
Straight leg raising	80°	50° with pain
Flexion	135°	135°
Rotation in flexion		
Internal	30°	30°
External	40°	40°
Ober test	22.5 cm	11.3 cm

The knee and ankle jerks were present and equal.

A diagnosis was made of contracted fascia lata, worse on the right side. Although the pain was on the left side, the right thigh and lower back were strapped with adhesive tape in the manner described. There was immediate relief of pain in the left thigh and the patient was able to walk without difficulty.

The patient was seen again 12 days after strapping. She had been free from pain except for 'occasional twinges' in the left thigh. The motions of the back and the hip motions were normal. The Ober and Ely tests were

negative. The strapping was removed and the patient given exercises to stretch the fascia.

The patient was seen 1 week later, or 19 days after application of the strapping. She had no pain. The hip and back motions were normal. The Ober and Ely tests were negative.

**Case 4** A 36-year-old housewife was seen November 17, 1938, complaining of severe pain in both sacroiliac regions of 3 days' duration. The pain was worse on the left side. There was no radiation of pain down the leg and no increase of pain on sneezing or coughing. Renal calculi had been removed 6 years previously and uncomplicated syphilis had been treated for the previous 6 years. Wassermann tests had been negative for the previous 21 months. The patient's physician had strapped her back with adhesive tape, but without relief.

Examination showed a well-developed and nourished woman in acute distress, walking with a left limp and a list to the left. There was a right total scoliosis. Forward flexion of the spine in the standing position was markedly limited. Palpation of the back showed tenderness over both posterior superior iliac spines with more tenderness on the left. Hip motions were as follows:

	RIGHT	LEFT
Straight leg raising	70° with pain	70° with pain
Flexion	130° with pain	130° with pain
Rotation in flexion		
Internal	30°	30°
External	45°	45°
Ober test	10.0 cm	22.5 cm.
Ely test	13.8 cm.	18.8 cm.

The knee and ankle jerks were active and equal. The legs were of equal length.

A diagnosis was made of contracted fascia lata on the left due to spasm of the tensor fasciae latae and gluteus maximus muscles. Roentgenograms were taken of the lower dorsal and lumbar spine and sacroiliac joints. They revealed a list to the left and right dorsolumbar scoliosis. Adhesive strapping was then applied to the left thigh and back. There was immediate and complete relief of pain. The patient was able to stand straight, walk and run without a limp. X rays taken after strapping showed disappearance of the list and diminution of the scoliosis.

The patient was seen 2 days later. She had no pain in the back. During the preceding day only 'slight stiffness or soreness' in the small of the back had been present. Under the Ober test the knees touched the table without effort or pain. The heels lacked 2 cm. of touching the buttocks in the Ely test. The patient was seen again 5 days after strapping. She had no back pain, and examination of the back was negative. Three days later, or 8 days after strapping, the adhesive tape was removed. The patient had no back pain. Examination of the back was normal and the Ober and Ely tests were negative.

#### DISCUSSION

The fact that back strain with sciatica may, in some cases, be cured by heat and massage, leg traction or manipulation seems to point to localized muscle spasm as the underlying lesion in these patients. Frequently at the onset of pain a "give" or "snap" is felt which is in accord with these considerations. The relation of the tensor fasciae latae to back strain with sciatica was first pointed out by Ober<sup>1</sup> in 1935. In 1937 he reported 75 per cent of complete cures by fasciotomy of the fascia lata and proposed two explanations for these re-



sults the contracted fascia lata exerts an abnormal pull on the pelvic bones and so causes a mechanical distortion of the spine, resulting in pain, or the pain may be due to spasm of the muscles about the posterior aspect of the hip joint. Freiberg, in 1934<sup>5</sup> and again in 1937,<sup>6</sup> discussed the relation of the piriformis muscle to sciatica and reported his operation for cutting the muscle. He found that in about 10 per cent of cadavers the sciatic nerve or its peroneal component pierced the muscle, and even when the nerve did not pass through the muscle, it lay in the great sciatic notch where spasm of the muscle could cause compression. Hence there is evidence that increased tension of the tensor fasciae latae, gluteus maximus and piriformis muscles may be etiologic factors in the causation of back symptoms or leg pain. It is also possible that pain along the distribution of the superior and inferior gluteal nerves may be related to muscle spasm. Since the action of the tensor fasciae latae is to abduct and flex, and that of the gluteus maximus and piriformis muscles to rotate the leg externally, the position of abduction, flexion and external rotation was chosen for strapping. The anterior portion of the adhesive strapping relieves the strain on the tensor fasciae latae, the posterior portion that on the gluteus maximus, and the position of external rotation supports the gluteus maximus and piriformis muscles.

The many causes of back pain, such as ruptured intervertebral disk, sacroiliac joint changes, disease of the spinal cord and pelvic disease,

are beyond the scope of this paper, since the method of treatment here presented is not designed for patients with such conditions. In conclusion, it is believed that this method may prove to be an addition to our conservative therapy, and that further application in a larger series of cases is desirable in order to evaluate its possible usefulness.

#### SUMMARY

A new, simple method of strapping for back strain with sciatica is presented, particularly for cases with contracted fascia lata or pain on internal rotation of the leg in the prone position.

The thigh and back are strapped with adhesive tape in such a manner as to relieve strain on the tensor fasciae latae, the gluteus maximus and the piriformis muscles.

The treatment is based on the assumption that back pain with sciatica may in some cases be due to localized muscle spasm, which either disturbs the mechanics of the spine or directly irritates the sciatic or gluteal nerves.

15 Bay State Road

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# MASSACHUSETTS MEDICAL SOCIETY

## PROCEEDINGS OF THE COUNCIL

STATED MEETING, FEBRUARY 1, 1939

A STATED meeting of the Council of the Massachusetts Medical Society was held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, February 1. The president, Dr Channing Frothingham, Suffolk, was in the chair, and 192 councilors were present (Appendix No 1).

The record of the meeting of the Council, held on October 5, 1938, was presented as published in the *New England Journal of Medicine*, issue of November 10, 1938, and was declared approved as published.

The President read the following obituaries

DR ALFRED A WHEELER, of Lcominster, died July 22, 1938,\* in his sixty-eighth year.

Born at Claremont, New Hampshire, he graduated from Harvard University and received his degree from the Harvard Medical School in 1894. He was district physician at the Boston Dispensary and admitting physician to the Out Patient Department of the Massachusetts General Hospital in 1895. From 1900 to 1906 he was surgeon to the Boston Dispensary.

Dr Wheeler was a fellow of the American Medical Association, and was a councilor and supervising censor from the Worcester North District at the time of his death.

His widow and four children survive him.

DR. MAX STURNICK, of 12 Columbia Road, Dorchester, died during the late fall of 1938. He was in his sixty second year.

Dr Sturnick received his degree from the Harvard Medical School in 1904. Since graduation as a house officer from the Boston City Hospital he had practiced medicine successfully in Dorchester. He was a member of the American Medical Association. At the time of his death he was a councilor of the Massachusetts Medical Society from the Norfolk District.

His widow survives him.

The Council stood for a period of silence out of respect to the memory of these councilors.

The report of the Auditing Committee was presented by the Treasurer (Appendix No 2). It was voted to accept the report as presented.

The report of the Treasurer (Appendix No 3) was presented by him and was duly accepted by the Council with applause. The Treasurer's report contained the recommendation that he be authorized to charge off or reduce the book value of two securities which had been carried on the books at their cost price. These securities are in the Build-

ing Fund and involve an issue of the Conveyancers Title Insurance and Mortgage Company guaranteed 4½ per cent bonds and an issue of Chicago, Rock Island and Pacific Railway first mortgage 4 per cent bonds due in 1934. The reason for the motion was to enable the Treasurer to present a truer picture of the actual assets of the Society. The motion was duly seconded and was carried. The Treasurer's suggestion concerning an honorarium for the Orator was referred to the Committee on Financial Planning and Budget.

### REPORTS OF STANDING COMMITTEES

#### *Financial Planning and Budget*

As this was the first report of a new committee, the chairman, Dr John Homans, Suffolk, stated that it was the committee's intention to proceed slowly and to gain familiarity with the work of the various committees and the necessity for expenditures by each. He said that the committee believes that the Society's external relations should be encouraged in every way, for example matters dealing with the government's interest in public health and its increasing invasion of the field of medicine, also matters dealing with the instruction of the profession. Other committees had been encouraged to express their views and certain problems such as those of the *Journal* had been discussed with the committee. The Council voted to accept the report. Dr Homans next presented the budget which had been prepared for the coming year and copies of which had been placed in the hands of the councilors (Appendix No 4).

Dr Edward Mellus, Middlesex South, moved that the item "returns to district societies" be increased to \$5000 since in his opinion the life of the Society is dependent on the activities of the district societies, and the recent reduction in this item has undoubtedly influenced these local activities. He pointed out the burden which had been placed on the district societies by the Council's decision to conduct the survey on the adequacy of medical care for the American Medical Association and to place the responsibility for this survey in the hands of the district societies. In some districts an extra two-dollar assessment had been necessary. He believed that the principle of extra assessments is very obnoxious to members of the district societies and seriously interferes with attendance and

\*Notice of death received after the meeting of the Council on October 5, 1938.

enthusiasm. He pointed out the saving that had been made by changing the publication of the *Directory* from an annual to a biennial basis. In his opinion some of this saving should be returned to the district societies. This motion was duly seconded.

During the discussion the treasurer, Dr. Charles S. Butler, Suffolk, showed that the excess of income over expenditures for the present year was in no small part due to a profit made from the sale of securities and, in his opinion, an increase in the amount returned to the district societies would be unwise.

Dr. Mellus insisted that the Society is constantly growing and that it needed the best it could get from the district societies. He suggested that there were many little ways in which the Society could economize, such as in the amount of material mailed by certain committees.

Dr. Homans felt called upon to defend the action of his committee in presenting the budget. He stated that this refund to the district societies belonged in the category of matters of internal administration and as such was one of the items on which the Society might economize. However, it appeared that this item was essential to keeping the Society active and the members interested. In his opinion, the refund was not a particularly good way of co-operating with the district societies but he would rather see this amount raised and the money expended whenever the district societies needed more money to keep them going at their most active and useful pace. When the vote was taken, it was found necessary to make a count. There were forty-four in favor of the motion and fifty opposed. The chair ruled that the motion was lost. It was then voted to adopt the budget as presented by the committee.

#### *Membership*

The chairman, Dr. H. Quimby Gallupe, Middlesex South, presented the report of the committee which recommended that seventeen fellows be allowed to retire, four allowed to have their dues remitted, twenty-five allowed to resign, thirty-nine be deprived of the privileges of fellowship and one allowed to change his district without change of legal residence (Appendix No. 5). The Council adopted the report and approved the recommendations.

#### *Arrangements*

The report was presented by the chairman, Dr. Richard P. Stetson, Norfolk (Appendix No. 6). This report contained the announcement that the one hundred and fifty-eighth annual meeting of the Society would be held in Worcester on June 6, 7 and 8, 1939. The report was accepted. The

committee recommended an allotment of an item of \$1500 for the expense of the committee, and since this was included in the budget adopted, the chair ruled that no separate action was needed.

#### *Ethics and Discipline*

The report was presented by the chairman, Dr. Robert DeNormandie, Suffolk (Appendix No. 7). The report was duly accepted.

#### *Medical Education and Medical Diplomas*

The chairman, Dr. Reginald Fitz, Suffolk, stated that the committee requested the various members of the Council to ask as many members as possible in their district societies to help the work of the committee by sending in to it confidential communications regarding the fitness of candidates for admission to the Society. He pointed out that the list of new candidates is published in the *New England Journal of Medicine* prior to the censors' meetings. The work of the committee would be greatly helped if such confidential information could be obtained so that better discrimination might be made in the acceptance of diplomas. The Council voted to accept the report.

#### *State and National Legislation*

The report was presented by the chairman, Dr. Charles C. Lund, Suffolk. He called attention to a mimeographed report which had already been sent to the various members of the Council and members of the district legislative committees, which contained a great deal of information about each of the legislative bills so far studied by the committee. He called attention to the new regulations of the State Department of Public Health concerning blood transfusions. These regulations have served to obviate the necessity for the introduction of legislation in this matter. He reported that no bill concerning premarital examinations for protection against syphilis had met the approval of the committee which, however, does not believe it impossible to write such a bill. He said that the Massachusetts Society of Social Hygiene was attempting to do this.

At the time of issuing the preliminary report to the councilors, the committee was not aware of any bills having to do with health insurance. Since that time, however, a new bill, containing forty-three pages of single-spaced typewritten material, had been introduced by one of the labor organizations. He said that it is not the old bill which has so frequently been presented and that its provisions are so broad and the implications so extensive that the committee would need to devote a great amount of study to it. It would appear, however, that it contains many objectionable features.

Dr Lund stated that there was still disagreement as to the constitutionality of any proposal which would prevent the licensing of aliens and it was not known if such a bill would be introduced in the present session. There was one, however, which would forbid the issuing of licenses until the applicant had taken out first papers for citizenship. The committee had not yet studied this bill. He reported that a recess commission had been studying bills to establish separate boards of licensure in osteopathy and chiropractic. This report was thoroughly discussed in the communication sent to the councilors. So far nothing new had developed. He reported that there would be a hearing on February 2 on the bill to license hospitals, nursing homes and convalescent homes. He said that the nurses' reorganization bill is still in an unsatisfactory state and that, at the present time, no definite stand could be recommended.

He reported that the committee was divided in the matter of annual registration. Three members of the committee and the President favored the bill and two members opposed it. He explained the confusion which had occurred in connection with the hearing. He had been informed by a member of the committee that there would be a postponement until after the Council meeting, but a hearing was held as scheduled with a number of physicians appearing in opposition. The osteopathic physicians were quite fully represented in opposition. Dr Stephen Rushmore appeared in favor of the bill as did a few others. He called attention to the legislative bulletin which listed the bills that had been studied up to February 1 and which indicated those that the committee favored, those to which it was opposed and those on which a stand had not yet been taken.

After some discussion Dr David L. Lionberger, Norfolk, a member of the committee, was permitted to read a minority report from the committee which stated that the minority approved of the stand indicated in the legislative bulletin with certain exceptions, the chief one of which was in regard to annual registration. The minority recommended opposition to House Bill 60, which provides for annual registration of physicians, giving as its reasons that the Board of Registration in Medicine already had sufficient powers to correct the evils toward which the proposed bill was directed. He pointed out that the provisions of the present law direct the Board to investigate all complaints of violation of the act and to report these to the proper prosecuting officers. The minority believed that the matter of financing such prosecutions was one which concerned the Board and not the medical profession.

He pointed out that the expenses of the Board over a period of years had been much less than the amount of the fees received. The minority believed that such a bill would lead to further regimentation. The minority did not believe that the profession should be asked to purchase political favor by a provision which would merely insure additional income to the State. The Council voted to accept the minority report.

There was still further discussion as to the parliamentary procedure in handling the two reports. The chair ruled that both reports had been accepted by the Council. Both Dr Lionberger and Dr Lund rose to a point of order. The chair asked for a rising vote to sustain his ruling and it was found that this ruling was sustained by the Council.

Dr Lund then moved that the Council go on record as supporting the recommendations of the Committee on State and National Legislation as shown in the legislative bulletin of February 1, with the exception of House Bill 60 (annual registration). The motion was seconded and was carried after some discussion. It was pointed out that the matter of the attitude of the Council toward House Bill 60 was still in question and would need to be voted upon.

Dr Lund then moved that the privileges of the floor be extended to Dr Francis R. Mahony, of Lowell, chairman of the Board of Registration in Medicine. This motion was duly seconded and passed. Dr Lund then moved that the Council record itself in favor of the annual registration of physicians as provided in House Bill 60. This was duly seconded.

In the discussion which followed Dr David Cheever, Suffolk, asked that Dr Mahony be requested to make a statement defining the attitude of the Board of Registration in Medicine and Dr Mahony was asked by the President to come forward.

Dr Charles E. Mongan, Middlesex South, asked for information. He desired to know if the guest proposed to discuss the bill or was he simply present to answer questions asked by members of the Council. He stated that if Dr Mahony were to discuss the bill he would object since Dr Mahony was not a member of the Council. It was finally asked to have the stenographer read Dr Lund's motion verbatim. This motion was as follows:

I now move that the privileges of the floor be extended to Dr Francis Mahony, of Lowell, chairman of the Board of Registration in Medicine, who has come here to answer questions any members of the Council wish to ask him.

Dr Mongan then pointed out that the vote did not provide for a statement by Dr Mahony.

Dr Robert B Osgood, Suffolk, said that the Council wanted information and that, while Dr Mongan might be technically right, the obtaining of information was the important thing and that this was the spirit of the Council's vote. There was still further discussion.

Dr Cheever was finally permitted to ask Dr Mahony to state why he was in favor of annual registration.

After still further discussion Dr Mahony spoke to the Council stating that he was happy to have the privilege of appearing chiefly because it demonstrated that there was a spirit of co-operation between the legislative committee of the Society and the Board of Registration in Medicine. In answering Dr Cheever's question he felt that he would also be answering that of Dr Mongan. He stated that at first he was opposed to annual registration but, upon considering carefully the object of the bill which is not to protect licensed physicians from illegal competition but really to protect the public, even though it places a burden upon the medical profession, he believed that it should be supported. He stated that he realized the nuisance which it would create but, since the practice of medicine is of such vital importance to the interest of the State, steps should be taken to protect the public from quacks and charlatans who are practicing without license. He said that it was true that the Board had a record of the first registration of every license, but the Board had been in existence for a long time and consequently the records are not conclusive men who had been licensed might have left the State or be dead. He stated that there have been instances of men practicing with licenses of deceased physicians. In his opinion the only way in which the problem could be met was by having annual registration. He pointed out that the objectionable features had been eliminated from the bill. He said that the questions to be answered are not difficult and, while the fee of two dollars must necessarily go into the general funds, it can come back to the Board by way of annual appropriations. He called attention to the economy which was forced on the Board and the limitations which were placed on its expenditures. He pointed out the duties of the inspectors which it is contemplated to engage. These men would obtain evidence of illegal practice of which there appears to be a considerable amount. He recalled that at one legislative hearing an unlicensed practitioner boasted that there were approximately three hundred practitioners of his cult in the State. He discussed the penalty clause of the bill which does not appear to be excessive. He stated that neglect to register would not destroy

the license to practice since a license once issued was good until revoked by the Board, but that annual registration of such license was necessary under the provisions of the bill.

Questions were asked by Dr Solomon Schwager, Berkshire, Dr Brainerd F Conley, Middlesex South, Dr William H Robey, Suffolk, Dr Kenneth L MacLachlan, Middlesex East, Dr J Harper Blaisdell, Middlesex East, Dr Osgood, Dr Edward F Timmins, Suffolk, Dr Richard Dutton, Middlesex East, and two other councilors whose names were not given.

In reply to certain of these questions, Dr Mahony stated that we are being fully taxed at the present time. This is another form of indirect taxation. It was apparent to him that there is some suspicion that the Board of Registration in Medicine is antagonistic to the Society, but while he has been a member of the Board, he has found this to be untrue. He said that the members are physicians and some of them are former members of the Society. He stated that when they act they must consider questions of principle and that the opinions of the members of the Board were usually those of the Council. In his opinion, the annual registration of physicians should be given a trial. In his opinion this bill would aid in apprehending individuals who are illegally registered or who are practicing without a license. He said it would allow the employment of two inspectors whose duty would be to produce evidence of illegal practice. He pointed out that at present the Board is dependent on the State Police, an extremely busy body of men and that there is always delay and the condition is not satisfactory. In his opinion such a bill would protect the public by the elimination of the illegal practitioner. He stated that evidence of illegal practice, which was referred to by one of the questioners, was already under investigation by the State Police. Dr Mahony added that a bill was to be introduced which would eliminate the present unfortunate condition which allows only three members of the Massachusetts Medical Society to serve as members of the Board. He stated that eighteen other states have annual registration and are satisfied with it. He was not able to answer the question as to how successful the annual registration of dentists had been in Massachusetts.

Dr Conley pointed out that communications had been received from the profession in fourteen of the eighteen states referred to by Dr Mahony and that an opposite view was indicated since the money provided by the annual registration had not been utilized for the purpose intended.

Dr Mahony stated in answer to Dr Dutton's

question that he did not know of any co-operation between town clerks and the Board with regard to the registration of licenses

Dr Lund was not in agreement with Dr Conley on the interpretation of the opinions received from the profession in other states. He said that in certain cases at least the profession was satisfied that there was an improvement in conditions. In his opinion the law would do a minimum of harm and create a minimum of nuisance, and it would give the Board funds with which to work.

The matter was finally put to a vote and it was found that the Council approved of the majority report from the Committee on State and National Legislation to support House Bill 60 for the annual registration of physicians. When this vote was questioned a count was made 114 were in favor and 34 opposed.

In connection with the bills on which the stand was undetermined Dr Lund reported that further study was necessary. In connection with House Bill 73, which provides for a supplementary report of congenital deformities, the Council voted to support the bill provided the language be altered to the satisfaction of the committee. House Bill 1407 proposes to prohibit aliens from practicing medicine by forbidding the Board to examine an applicant until he has taken out his first papers. It was voted to instruct the committee to favor the bill, with the inclusion of a provision for revocation of license in case the applicant fails to become a citizen within a reasonable time.

The President asked if there was any additional material to be presented by the minority and Dr Conley explained that Dr Lionberger had been called away in an emergency but that he (Dr Conley) would be glad to continue the minority report if it was so desired. After some discussion the chair ruled that the Council had acted on the minority report and had voted on all the bills that the committee had considered. The chair stated that if, however, there was any specific motion in connection with the minority report, he should be glad to entertain it. After considerable discussion as to how further action could be obtained on the minority report, it was finally decided that the Council had already voted confirming the attitude of the Committee on State and National Legislation as presented in the legislative bulletin and that, since it had acted specifically in the case of House Bill 60 (annual registration) and since there was no proposal directly before the Council to amend this action, the Council would proceed with the regular order of business.

## *Publications*

The chairman, Dr Roger I Lee, Suffolk, reported that his committee had chosen the Shattuck Lecturer for the annual meeting and that the Secretary would make this report to the Council. The Secretary later announced that the person chosen was Dr Wilder Penfield, of Montreal.

## *Public Health*

The report was presented by the chairman, Dr Osgood (See Appendix No 8). Dr Osgood in addition to the remarks contained in his formal report stated that the committee was very anxious to have the co-operation and criticism of the Society and would appreciate receiving comment favorable or unfavorable concerning its activities. He referred informally to several matters which had come to the attention of the committee but which were not considered of sufficient importance to be included in the report. The Council voted to accept the report.

## *Permanent Home*

The report was read by the chairman, Dr Robey (Appendix No 9). The Council voted to accept the report.

## REPORTS OF SPECIAL COMMITTEES

### *Cancer*

The report was presented by the chairman, Dr Shields Warren, Suffolk (Appendix No 10). It was accepted by the Council.

### *Postgraduate Instruction*

The chairman, Dr Frank R Ober, Suffolk, presented the report which was duly accepted (Appendix No 11). The following recommendations of the committee were duly presented and approved by the Council.

- 1 That the committee be instructed to present a post graduate assembly next fall, and that the other New England state medical societies be invited to co-operate in sponsoring such an assembly if they so desire.
- 2 That the postgraduate extension courses and the teaching clinics be continued in co-operation with the government agencies, as has been done in the past.
- 3 That the chairman or secretary of the committee be instructed to attend the official meetings of the Associated Postgraduate Committees.

Dr Ober informed the Council that he intended to go to the meeting of the Associated Postgraduate Committees and that there would be no expense to the Society should he carry out his plans. Upon motion of Dr Osgood, duly seconded it was voted that the appreciative thanks of the

Massachusetts Medical Society be extended to Harvard University for allowing the use of Sanders Theater to the delegates at the New England Postgraduate Assembly. The President pointed out that he appreciated this action of the Council because he had already expressed to the Corporation the thanks of the Society.

### *Public Relations*

The report was presented by the secretary, Dr Elmer S Bagnall, Essex North, and was accepted (Appendix No 12).

Dr Hilbert F Day, Middlesex South, asked if the activities of the committee would be hampered by the cut which had been made in the committee's appropriation. The President stated that the cut was made because the committee had not expended its full appropriation and that, with the introduction of economies, a larger appropriation would not be necessary, in his opinion.

Dr Alexander A Levi, Middlesex South, asked that the letter describing the work done on the Ward Plan of the hospital insurance scheme in Lowell be read to the Council. He also asked if the committee had been consulted about certain changes in the details of the service furnished by the Associated Hospital Service Corporation, particularly with reference to anesthesia. The President replied that these changes had been discussed by the committee and that any prepayment plan for physicians' services would also be discussed.

Dr Michael A Tighe, Middlesex North, was then asked to read the report of the Lowell arrangements (Appendix No 13).

After Dr Bagnall read the recommendation contained in paragraph B of the committee's report Dr Leon A Alley, Plymouth, offered an amendment.

The President explained, in answer to questions, that at present the Associated Hospital Service Corporation insured only the patient's hospital bill and that the proposal to insure payment of doctors' fees by that organization would be limited to those policyholders who were receiving hospital benefits. The President also pointed out that the Associated Hospital Service Corporation is in a proper position to bring out an insurance scheme with or without co-operation from physicians but that it does not wish to do so. The matter was introduced to obtain an expression of opinion as to whether voluntary schemes should be handled by the Committee on Public Relations or should be referred back to the Council. In his opinion, delay in these matters might expedite the onset of compulsory sickness insurance.

Dr Lund expressed the opinion that the work

of his committee, in opposing a compulsory insurance bill now before the Legislature, would be strengthened if his committee could be assured that there was an arrangement in the Society which would allow such matters to be handled with expedition. He strongly favored the original motion.

Dr Levi asked for information concerning certain matters which had been referred to his district for a vote. He said that these matters had to do with the appointment of members of that district to represent it in the formation of the charter of the Associated Hospital Service Corporation, and that later the district was asked to have two members chosen to vote on changes which had been proposed.

Dr Blaisdell pointed out that the large directorate of the Associated Hospital Service Corporation is made up of delegates from various agencies, including medical societies, charitable groups, and so forth, and that a meeting is held annually for the purpose of going over important matters.

Dr Tighe expressed the opinion that the Council did not desire to give a subordinate committee the power which was implied in the original recommendation. In his opinion the Council should continue to reserve to itself the right of placing final approval or disapproval on any matter which is clearly of interest to a large number of its fellows. He expressed himself as favoring the amendment and opposing the original recommendation.

After some further discussion, the original motion with the amendment was duly passed. This action provided that, since the Committee on Public Relations had considered in principle a plan contemplated by the Associated Hospital Service Corporation for insurance to cover physicians' charges coincident with simultaneous insured hospitalization, the Council of the Massachusetts Medical Society approved in a general way of the suggestion and referred the matter back to the committee for detailed study, it being the understanding that the Council reserves the right of final action on any plan or plans which may result from these studies.

The Council recessed for the Cotting Luncheon.

Dr Bagnall read paragraph C of the committee's report which approved of the plans offered by the Farm Security Administration to provide loans to farmers for payment of doctors' bills. There was adverse discussion by Dr Francis P McCarthy, Norfolk, Dr Edward A Adams, Worcester North, and Dr John P Monks, Suffolk, and favorable comment by Dr Ernest L Hunt, Worcester. Upon a vote it was discovered that the recommendation of the committee was lost.

Dr Bagnall next presented the following

On recommendation of the American Medical Association that we establish in Massachusetts a Committee on Industrial Health, we recommend that the President be authorized to establish such a special committee to proceed at once to study the problems in this field in Massachusetts

The Council voted to approve this recommendation

Dr Frederick W O'Brien, Suffolk, presented a communication which had already been sent to the Committee on Public Relations (Appendix No 14) The President stated that, in his opinion, the matter in Dr O'Brien's communication is of vital importance and that it is at present under consideration by the committee He recalled that the Society had instructed the committee to bring various groups representing organized medicine into conference with groups representing organized hospital service He pointed out that a subcommittee, under the chairmanship of Dr Francis H Dunbar, had been bringing these groups together in the hope that some conclusion could be reached He said that it is the desire of the Associated Hospital Service Corporation that the doctors and the hospitals reach a satisfactory agreement so that the policies issued by the corporation may fit whatever plan the hospitals and the doctors propose

Dr John M Fallon, Worcester, presented a communication from the New England Society of Anesthesiology (Appendix No 15) The President stated that this was more evidence showing the necessity for the doctors and hospitals to reach an agreement in these matters of special service He stated that the Associated Hospital Service Corporation is interested in seeing that there is no discrimination against its subscribers, who, it believes, should receive the same treatment from the hospital as the hospital gives to other individuals who have the same type of hospital accommodations and for which they pay the hospital directly The President answered a question from Dr MacLachlan stating that *at present the sum of five dollars is allotted* to the hospital by the corporation when anesthesia is given by a salaried employee of the hospital or a house officer, otherwise the hospital gets nothing

#### Miscellaneous

The President read the names of five fellows whose applications for restoration to fellowship had been studied by regularly appointed committees and whose restoration was recommended (Appendix No 16) The Council voted to confirm the recommendations in these cases

The President stated that the committee appointed to consider the name of Dr Hyman S

Queen, of New Bedford, recommended that he be not restored The Council voted to approve the recommendation

#### APPOINTMENT OF DELEGATES

The President presented nominations of the following to serve as delegates and alternates to the House of Delegates of the American Medical Association for two years beginning June 1, 1939

<i>Delegates</i>	<i>Alternates</i>
Edmond F Cody, Bristol South	Edward L. Merritt, Bristol South
John M Birnie, Hampden	Robert J Carpenter, Berkshire
Richard H. Miller, Suffolk	Cadis Phipps, Norfolk

There being no other nominations from the floor, it was moved and seconded that the nominations be closed and the Council voted to elect those named above

The President presented nominations of the following to serve as delegates to the annual meetings of the other state medical societies in New England

<i>Maine</i>	Frank W Snow, Essex North
	Charles F Warren, Essex North
<i>New Hampshire</i>	Edward A Adams, Worcester North
	Thomas R. Donovan, Worcester North
<i>Vermont</i>	Howard M Kemp, Franklin
	Modestino Criscitello, Jr, Berkshire
<i>Rhode Island</i>	George W Blood, Bristol South
	Harold E Perry, Bristol South
<i>Connecticut</i>	Theodore L. Story, Worcester
	William A R. Chapin, Hampden

Upon a motion, duly seconded, it was voted to approve the appointments

The President nominated Dr Alexander S Begg, Norfolk, as delegate to the Annual Congress on Medical Education and Licensure of the American Medical Association On motion, duly seconded, the selection was approved

#### APPOINTMENT OF COMMITTEES

The President proceeded to announce the list of those applying for restoration to fellowship and the names of the committees appointed to consider each case (Appendix No 17) The Council voted to approve the recommendations

The President nominated the following fellows to represent the Society on the Massachusetts Central Health Council

Robert J Carpenter, Berkshire
George D Henderson, Hampden
William D Kinney, Barnstable
Erwin C Miller, Worcester
Robert B Osgood, Suffolk
Michael A Tighe, Middlesex North



The nominations were confirmed by vote and the appointments approved

#### INCIDENTAL BUSINESS

The Society voted to confirm the election to fellowship of John W Turner, of Westfield, whose name was received too late for publication in the *New England Journal of Medicine*, as required under the by-laws, and who was passed by the Board of Censors of Hampden District.

The President announced that the Council had ordered the publication of the by-laws as amended inasmuch as the amendments will result in certain minor changes in other parts of the by-laws, he proposed that a committee of three, plus the Secretary, be appointed for the purpose of editing the material before it is submitted to the printer. The Council voted to approve the appointment of this committee.

In order to facilitate the study of various plans proposed to assist individuals in the low-income class to obtain proper medical care, Dr Hunt introduced a resolution (Appendix No 18). After considerable discussion, which included some references to contract practice, the resolution was referred to the Committee on Public Relations.

The President announced that the physicians on Martha's Vineyard had requested an opportunity to present to the Council a statement of the situation in which they found themselves with regard to membership in their district society. Upon motion of Dr Tighe it was voted that unanimous consent be given to the representative from Martha's Vineyard to present a statement.

Dr Roswell H Smith, of Martha's Vineyard, stated that the physicians on the island are very anxious to have the benefit of the privileges accorded to fellows of the Society but, because of difficulties in transportation, it is impossible for these men to attend the meetings of the Bristol South District Medical Society at New Bedford or Fall River without the loss of an excessive amount of time. He pointed out that to attend such a meeting the physician must leave Martha's Vineyard by boat at six o'clock in the morning and, after a two and a half hour sail to New Bedford, must wait until the meeting is called, either at five in the afternoon or at eight o'clock at night. He said that it is then impossible for the member to return to the Vineyard on the same day and that as a result he must lose two days from his work in order to attend a society meeting. He illustrated the difficulty by pointing out that he had left Martha's Vineyard the preceding after-

noon at five o'clock and had arrived in Boston at nine in the evening and that, after attending the Council meeting and presenting his statement, it was impossible for him to return to the Vineyard until the next day, and only then provided the weather conditions were good. He said that the physicians in the Vineyard are very anxious to improve themselves in every possible way. He stated that after a long struggle they have succeeded in establishing a very good hospital, which operates the year round, and that they have organized themselves into the Martha's Vineyard Medical Society, with a membership of ten. He said that this Society meets each month and has had the pleasure of entertaining speakers from Boston and elsewhere and that the Massachusetts Medical Society had been helpful and co-operative in providing the assistance needed for the meetings. Since the group is interested in the work of the Society and is attempting to carry out its principles and precepts, he pointed out that it is desirous of being permitted to establish a separate district for this purpose.

In the discussion, the question was raised as to the situation on Nantucket. Dr Smith pointed out that Nantucket is in a separate county and that it is as difficult to get to Nantucket and back from the Vineyard as it is to get from Nantucket to Boston and return. The President recalled that a committee had previously been appointed to consider district boundaries. He said that Dr John M Burnie, Hampden, is chairman of this committee and suggested that the matter be referred to that committee for a report at the next meeting of the Council. The Council voted to approve.

Dr Henry M Landesman, Norfolk, stated that, under the operation of the "Gentleman's Agreement" the committee had had but eight complaints from physicians throughout the State and that these complaints had all been adjusted. He said that apparently the agreement is working satisfactorily. He reported that hospital officials have informed him that their difficulties over the collection of bills have been much reduced. Dr Landesman then spoke of two bills which had been introduced into the legislature by Representative Sirois, with reference to blood tests for syphilis. He stated that objections previously raised to certain provisions of the bill had been corrected and that he did not believe that the Society would be in opposition to them.

There being no further business to come before the Council, adjournment was declared at 3 15 p m.

Dr Bagnall next presented the following

On recommendation of the American Medical Association that we establish in Massachusetts a Committee on Industrial Health, we recommend that the President be authorized to establish such a special committee to proceed at once to study the problems in this field in Massachusetts

The Council voted to approve this recommendation

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	Harold E Perry, Bristol South
<i>Connecticut</i>	Theodore L. Story, Worcester
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Upon a motion, duly seconded, it was voted to approve the appointments

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Michael A Tighe, Middlesex North

Hartshorn and Walter  
Certified Public Accountants  
50 Congress Street  
Boston

January 26, 1939

The Auditing Committee  
Dr J B Thomes and Dr Augustus Thorndike, Jr  
The Massachusetts Medical Society  
Boston, Massachusetts

Gentlemen

At the request of your treasurer, Dr Charles S Butler,  
we have examined the books and accounts of the Massa-  
chusetts Medical Society for the twelve months ended  
December 31, 1938 and submit herewith

Schedule A Statement showing the balance sheet  
of the Massachusetts Medical Society,  
December 31, 1938

Schedule B Statement showing the revenue and  
expenses of the Massachusetts Medi-  
cal Society for the twelve months  
ended December 31, 1938

The cash on deposit in the banks has been reconciled  
with the bank statements and found correct.

The cash receipts as recorded have been properly ac-  
counted for and disbursements are supported by vouchers  
or canceled checks which were examined by us

The securities and savings bank books in the various  
funds were examined by us

The accompanying balance sheet and related statement  
of revenue and expenses fairly present its position at  
December 31, 1938 and results of its operations for the  
year

Respectfully submitted,  
HARTSHORN AND WALTER.

SCHEDULE A

STATEMENT SHOWING THE BALANCE SHEET OF THE MASSACHUSETTS MEDICAL  
SOCIETY DECEMBER 31 1938

ASSETS

Fund Securities and Cash	
Endowment funds	\$27 166 87
Building Fund	63 184 65
General Fund	103,354 72
Special Fund (medical instruction)	1 601 12
Total	\$190,307.36

LIABILITIES

Contribution from Commonwealth of Massachusetts for Special Medical Instruction	\$2 000 00
Less amount expended in 1938	398 88
Unexpended balance.	\$1 601 12

FUND ACCOUNTS

Endowment funds	
Shattuck Fund	
G C Shattuck 1854 1866	\$9 166 87
Phillips Fund	
Jonathan Phillips 1860	10 000 00
Cotting Fund	
B E Cotting 1876-1881 1887	3 000 00
Building Fund	63 184 65
General Fund	
Balance January 1 1938	\$98 730 45
Add unexpended revenue for the twelve months ended December 31 1938	4 624 24
Balance December 31 1938	103,354 72
Total	\$190,307.36

ENDOWMENT FUNDS

	Securities and Cash	Income
Shattuck Fund		
Annuity Policy Massachusetts Hospital Life Insurance Co Cert. No 438	\$9 166 87	\$229 17
Phillips Fund		
\$10 000 Commonwealth of Massachusetts 3 1/2 s Jan 1 1944 (reg)	10 000 00	350 00
Cotting Fund		
Deposit Institution for Savings in Roxbury No 45252	1 000 00	20 00
Deposit Provident Institution for Savings Boston No 1828	1 000 00	22.50
Deposit Suffolk Savings Bank Boston No 68364	1 000 00	20 00
Totals	\$22 166 87	\$611 67

BUILDING FUND

	Securities and Cash	Income	Premium Charged Off
Cash, New England Trust Co	\$3 464.31		
Deposit Framingham National Bank Savings Dept Book No 8592	360.37	\$8 81	
Deposit Franklin Savings Bank Book No 172838	1 774 89	39.26	
— American Tel & Tel Co Deb 3 1/2 s, Oct. 1 1961 (sold)		21 67	
1 000 Blackstone Valley Gas & Electric Se- ries C 4s Nov 1 1965	1 025 00	40 00	
1 000 Boston & Albany R.R. 1st Mtge. Se- ries A 4 1/2 s April 1 1943 (Guar- anteed)	967.50	45 00	
3 000 Canada Dominion of Temp Bond 3s Nov 15 1968	2,917 50	2.01*	
2 000 Central Illinois Public Service Co 1st Mtge. Series A 3 1/2 s Dec. 1 1968	2 010 00	3 12*	
1 000 Central Pacific Ry Co 1st Ref Mtge. 4s Aug 1949	717 80	11 44	
1 000 Chicago Burlington & Quincy R.R. Co 4s Mar 1 1958	977 78	16 67	
5 000 C/D Chicago R. I & Pacific Ry 1st Ref 4s April 1 1934 (in default)	4 735 00		
5 000 Conveyancers Title Insurance & Mort- gage Co Part Mtge. 4 1/2 s Oct. 31 1939 (in default)	5 000 00		
1 000 Cincinnati Union Terminal 1st Mtge. Series C 5s May 1 1957 (guar- anteed)	1 000 00	50 00	
1 000 City of Buffalo N Y 4.20% Sept. 1 1939	1 020 00	42 00	\$10 00
1 000 City of Fitchburg Mass. 4s Aug 1 1939 (reg)	1 018.50	40 00	9 00
1 000 City of Pittsburgh Pa. 3 1/2 s April 1 1939	1 010 00	32.50	10 00
1 000 City of St. Paul Minn 4s, Feb 1 1939	1 010 00	40 00	
1 000 City of Quincy Mass. 3 1/2 s, May 1 1943	1 016 00	35 00	
1 000 Commonwealth of Massachusetts 3s July 1 1939 (reg)	1 010 00	30 00	10 00
1 000 Connecticut River Power Co. Series A 3 1/2 s Feb 15 1961	1 045 00	37.50	
—General Motors Acceptance Corp 3 1/2 s Aug 1 1951 (sold)		25 73	
1 000 Kansas City Mo 4 1/2 s, Dec 1 1945	1 040 00	42.50	
2 000 N Y Central R.R. S F Sec 3 1/2 s, April 1 1946	1,960 00	75 00	
1 500 N Y Chicago & St. Louis R.R. Notes 6s Oct 1 1938 (extended to Oct 1 1941) Deposit receipts	1,500 00	90 00	
— Southern Bell Tel & Tel Co Deb 3 1/2 s April 1 1962 (sold)		16 16	
— Standard Oil Co. of N J Dec 3s June 1 1961 (sold)		33 16	
500 Swampscott, Mass. Series D 3 1/2 s, Sept 1 1942	530 00	17.50	3 75
2 000 The Toledo Edison Co 1st Mtge. 3 1/2 s July 1 1963	2 030 00	8 56	
1 000 U S A Treasury Note Series A 1 1/2 s Mar 15 1941	1 000 00	15 00	
1 000 U S A Treasury 2 1/2 s Sept. 15 1952	1 000 00		
2 000 Virginian Ry Co 1st & Ref Mtge. A 3 1/2 s Mar 1 1966	2 045 00	75 00	
Boston Medical Library Note 4 1/2 s due April 1 1939	20 000 00	850 00	1 000 00
Gift from a friend			
Totals	\$63 184 65	\$7 16 21	\$42.75
Less bond premiums charged off		42 75	
Net income.		\$2 63 46	

NOTE. The net income from Building Fund \$7 673 46 has been trans-  
ferred to Building Fund principal  
Interest paid out

## APPENDIX NO 1

## ATTENDANCE

BARNSTABLE	L. M. Crosby
M E Champion	Richard Dutton
D E Higgins	E M Halligan
W D A Kinney	J H Kerrigan
	K L MacLachlan
BERKSHIRE	MIDDLESEX NORTH
J J Boland	C M Roughan
Solomon Schwager	M. L. Alling
BRISTOL NORTH	A. R. Gardner
H. L. Rich	F D Lambert
F H Dunbar	T A Stamas
W H Swift	A W Stearns
	M. A. Tighe
BRISTOL SOUTH	MIDDLESEX SOUTH
G W Blood	F R Jouett
R. B. Butler	C F Atwood
E F Cody	E W Barron
H. E. Perry	W B Bartlett
I N Tilden	E H. Bigelow
P E Truesdale	G F H Bowers
ESSEX NORTH	E J Butler
L. R. Chaput	B F Conley
E S Bagnall	D F Cummings
R. V. Baketel	C H. Dalton
J F Burnham	H F Day
Z W Colson	C L Derick
H. F. Dearborn	J E Dodd
G L Richardson	A. W. Dudley
F W Snow	H. Q. Gallupe
L. T. Stokes	H. G. Giddings
C A Weiss	H. W. Godfrey
ESSEX SOUTH	W G Grandison
H. A. Boyle	A. D. Guthrie
N P Breed	N M. Hunter
S E. Golden	A M. Jackson
J F Jordan	A. A. Levi
B B Mansfield	F P Lowry
A E Parkhurst	J A McLean
W G Phippen	Edward Mellus
J R. Shaughnessy	C E Mongan
FRANKLIN	J P Nelligan
F J Barnard	Dwight O Hara
H M Kemp	L. S. Pilcher
W J Pelletier	W D Reid
HAMPDEN	Max Ritvo
W A R. Chapin	E S A Robinson
G L. Gabler	E J Sawyer
P E. Gear	M J Schlesinger
Frederic Hagler	E F Sewall
M W Pearson	E. W. Small
G L Schadt	H. P. Stevens
HAMPSHIRE	R. A. Taylor
L. N. Durgin	H. W. Thayer
MIDDLESEX EAST	Fresenius Van Nüys
R. W. Sheehy	R. H. Wells
J H. Blaisdell	M. W. White
	NORFOLK
	D D Scannell
	F G Balch
	A. S. Begg

M I Berman	John Homans
William Dameshek	A. A. Hornor
G L Doherty	Rudolph Jacoby
Albert Ehrenfried	H. A. Kelly
D G Eldridge	R. I. Lee
H M. Emmons	C C Lund
C B Faunce, Jr	L S McKittrick
J F Ford	W J Mixter
L. M. Freedman	J P Monks
Maurice Gerstein	N A Nelson
J B Hall	R. N. Nye
L. F. Johnson	F W O'Brien
E L. Kickham	R. B. Osgood
H M Landesman	L E. Parkins
D L Lionberger	L E Phaneuf
F P McCarthy	Helen S Pittman
T J Scanlon	W H Robey
F J Simmonds	R. M. Smith
H. F. R. Watts	M. C. Sosman
	E F Timmins
	I J Walker
NORFOLK SOUTH	Shields Warren
N R. Pillsbury	Conrad Wesselhoeft
C S Adams	C F Wilinsky
R. L. Cook	
W G Curtis	
G V Higgins	
W L Sargent	

## WORCESTER

## PLYMOUTH

B H. Peirce
Jacob Brenner
A L. Duncombe
H. H. Hamilton
W H. Pulsifer
H C Reed

## SUFFOLK

Reginald Fitz
Walter Bauer
H L. Blumgart
W B Breed
W J Brickley
C S Butler
David Cheever
R. L. DeNormandie
A B Donovan
G B Fenwick
Channing Frothingham
M. N. Fulton
Joseph Garland

## WORCESTER NORTH

E A. Adams
H C Arey
W E. Curtier
C B Gay
A. F. Lowell

## APPENDIX NO 2

## REPORT OF THE AUDITING COMMITTEE

The Auditing Committee has received from the certified public accountants, Messrs Hartshorn and Walter, the audit of the books of the Treasurer, herewith submitted for 1938

The committee reports that the above mentioned certified public accountants examined the securities in the care of the Treasurer and found them present and correct.

JOHN B THOMAS, *Chairman*,  
ALGUSTUS THORNDIKE, JR.

EXPENSES		
<i>Salaries</i>		
Secretary	\$3 000 00	
Treasurer	1 000 00	
Executive assistant	1 946 20	
Editor emeritus of <i>Journal</i>	1 200 00	
		57 146 70
<i>Expenses of Officers and Delegates</i>		
President	\$60 56	
Secretary	1,369 40	
Treasurer	248 54	
District treasurers	2 610 78	
Censors	771 00	
Delegates to American Medical Association	2 057 98	
		7 118 26
<i>General Expenses</i>		
Maintenance of society headquarters (including clerical and other expenses)	\$4,341 87	
Shattuck Lecture	200 00	
Cotting Luncheons	290 00	
<i>Committee Expenses</i>		
State and National Legislation	\$1 840 13	
Public Health	325 84	
Medical Education and Diplomas	88 73	
Membership and Finance	3 75	
Ethics and Discipline	53 66	
Obstetrics and Gynecology	147 00	
Public Relations	207 86	
Arrangements	578 26	
Publications	98	
	3 246 21	
Miscellaneous expenses	6 25	
		8 084.33
<i>Refunds to District Societies</i>		4 000 00
<i>Standing Committees</i>		
<i>Publications</i>		
<i>New England Journal of Medicine</i>	\$21 000 00	
<i>Annual Directory</i>	1 572.93	
	\$22 572 93	
Medical Defense	1 129 76	
Committee on Postgraduate Instruction	602 26	
		24,304 95
Total expenses		50 653 74
<i>Unexpended Revenue</i>		\$4 624 24

APPENDIX NO 3

REPORT OF THE TREASURER

The Treasurer has had the same difficult problem, the past year, as for the previous two or three years,—perhaps even more acutely in 1938,—namely investing and re-investing the available funds of the Society. Interest returns on prime bonds are now lower than ever, due in part to large inflow of gold and in part to measures by U S Treasury Department. U S Government short paper has recently sold at no interest return, and prime corporation bonds, with maturities within five to ten years, are selling to net from 1½ to 2% per cent. The Treasurer looks ahead with much doubt. One result of these conditions has been that the Treasurer has carried a larger cash balance than necessary and this, in consequence, has reduced the income return from our invested funds which the Society should have received. It should be emphasized again, however, that the revenue from annual dues of fellows has been, as usual, the main source of income making about 90 per cent of our total.

Revenues received, during 1938 from annual dues of resident fellows amount to \$48,290, showing a considerable increase over 1937. Adding to this the annual dues from non resident fellows of \$1 489 makes the total income from dues \$49 779 the largest amount from this source ever received by the Society. Other revenues—invested funds, \$3,919 22 proceeds of sales of publications \$38 54 and profits from sales of securities \$1,521 22—amount to \$5,498 98. Therefore the Society's total revenue in 1938, not including income from the Building

Fund, was \$55,277.98. This is, again, the largest total ever received by the Society.

The Building Fund had a net income in 1938 of \$1,673 46, this is less than in 1937. But the Treasurer is glad to report a small profit of \$249 79 from sales of securities and a generous gift of \$1,000 to this fund from a loyal friend. The fund now has a book value of over \$63,000. In the fund, there are two issues of bonds, each of \$5,000, now for years in default, and hence with greatly reduced market values. The Treasurer recommends, for a clearer statement of this fund, that he be authorized to charge off, or reduce, the book values of these two issues, to their approximate present values. This mark-off would amount to \$8,000 for the two issues—one issue \$3,500, the other \$4,500. If the Council approves this, then the statement of the fund will show more accurately its value.

Expenses of the Society during 1938 totaled \$50,653 74. The activities of several committees for the protection of the health of the people, and for the good of the fellows of the Society were greater than ever before. All of us benefit thereby. There are not many items which can at present be reduced without curtailing the duties of the Massachusetts Medical Society, both the public and to our fellows.

The Treasurer ventures to offer a suggestion to the Council, namely, would it be proper to give the Orator a modest honorarium for his oration, from which we derive so much benefit, at the annual meeting?

The Society ends 1938 with unexpended revenues of \$4,624.24. Total assets now amount to \$190,307.36, an increase for the year of over \$9,000.

The Treasurer takes this opportunity to thank the officers of the Society and the district officers for their co-operation, and, especially, to thank the members of the office staff of the *New England Journal of Medicine* for their helpfulness and assistance.

The Treasurer invites questions.

CHARLES S BUTLER, *Treasurer*

APPENDIX NO 4

REPORT OF COMMITTEE ON FINANCIAL PLANNING  
AND BUDGET  
BUDGET FOR 1939

The following appropriations are recommended		
Salaries	Recommended for 1939	Appropriated in 1938
Secretary	\$3000	\$3000
Treasurer	1000	1000
Executive assistant	2000	2000
Editor of <i>Journal</i> emeritus	1200	1200
<i>Expenses of officers and delegates</i>		
President and vice president	500	500
Secretary	1400	1600
Treasurer	400	400
District Treasurers	2700	2600
Censors	900	825
Delegates to House of Delegates American Medical Association	1500	2300
<i>Maintenance society headquarters, including clerical and other expenses</i>		
Shattuck Lecture	5000	5000
Cotting Luncheons	200	200
	350	350
<i>Standing committees</i>		
Arrangements	1500	1600
<i>Publications</i>		
<i>New England Journal of Medicine</i>	20500	21500
<i>Directory</i>	500	2400
Membership and Finance	10	25

GENERAL FUND		Securities and Cash	Income	Premium Charged Off	
Cash Merchants National Bank		\$12 276 48			
Cash New England Trust Co		7 180 28			
Deposit Franklin Savings Bank Boston		1 074 48	\$24 17		
1 000 American Tel & Tel Co Deb 3½s Dec 1 1966		1 020 00	32 50		
— American Tel & Tel Co Deb 3½s Dec 1 1966 (sold)			30 06		
— Appalachian Electric Power Co 1st & Ref 5s May 1 1956 (called)			55 41		
4 000 Appalachian Electric Power Co 4s Feb 1 1963		3 950 00	75 56		
2 000 Atlantic Coast Line R.R. Co 4s July 1 1952		1 503 04	17 22		
2 000 Bethlehem Steel Corp S F series E 3½s Oct 1 1966		1 970 00	75 00		
3 000 Blackstone Valley Gas & Electric Co Series D 3½s Dec 1 1968 Temp Bond		3 142 50	1 47*		
1 000 Blackstone Valley Gas & Electric Co Series C 4s Nov 1 1965		1 025 00	40 00		
2 000 Boston & Albany R.R. 1st 4½s April 1 1943 (guaranteed)		1,935 00	90 00		
— Canadian National Ry Equip Series J 4½s May 1 1938 (guaranteed) (matured)			45 00	\$27 00	
1 000 Canadian National Ry Equip Series J 4½s May 1 1939 (guaranteed)		1 015 25	22 50	30 00	
1 000 Canadian Pacific Ry Equip Trust Series C 4½s Dec 1 1943		1 086 25			
2 000 Cedars Rapids Mfg & Power Co 1st Mtte. 5s Jan 1 1953		1 870 00	100 00		
2 000 Central Illinois Public Service Co 1st Mtte. Series A 3½s Dec 1 1968		2 010 00	3 12*		
3 000 Central Power & Light Co 1st 5s Aug 1 1956		2 730 00	150 00		
— Chesapeake & Ohio Equip Trust Series V 5s July 1 1938 (matured)			50 00	26 52	
2 000 Chicago Burlington & Quincy R.R. Co 1st Ref Series A 5s Feb 1 1971		2 155 70	55 28		
1 000 City of Buffalo Ref 4 20% Sept 1 1939		1 005 00	42 00	20 00	
— City of Malden Note, due Nov 9 1938 (collected)			13 17		
2 000 City of Buffalo 2 60% July 1 1939		2 025 00	52 00		
— City of Quincy Note due Sept 21 1938 (collected)			10 79		
— Commonwealth of Massachusetts 3½s Jan 1 1938 (reg) (matured)			17 50	10 00	
— Commonwealth of Massachusetts 3½s July 1 1938 (reg) (matured)			105 00	10 00	
1 000 Commonwealth of Massachusetts 3½s, July 1 1940 (reg)		1 035 00	35 00	20 00	
1 000 Commonwealth of Massachusetts 3½s Jan 1 1941 (reg)		1 000 00	35 00		
1 000 Connecticut River Power Co 1st 3½s Series A Feb 15 1961		1 045 00	37 50		
2 000 Consolidated Edison Co of N Y Inc 3½s Deb Jan 1 1958		2 035 00	31.30		
2 000 Conveyancers Title Insurance & Mort gage Co 4½s Dec 1 1937 (in default)		2 000 00			
— Erie County 4s Oct 15 1938 (ma tured)			40 00	30 00	
— General Motors Accept Corp 3½s Aug 1 1951 (sold)			32.50		
— General Motors Accept Corp 3s Aug 1 1946 (sold)			23 09		
1 000 Georgia Power Co 1st Ref 5s Mar 1 1967		862 50	50 00		
3 000 International Paper Co Ref Series A 6s Mar 1 1955		3 076 00	180 00		
2 000 Great Northern Ry Co Gen Mtge. B 5½s Jan 1 1952		1,932 50	110 00		
1 000 Great Northern Ry Co 1st & Ref 4½s July 1 1961		990.30	8 62		
1 000 Great Northern Ry Co Gen Mtge Gold Series I 3½s Jan 1 1967		975 00	37.50		
1 000 Jones & Laughlin Steel Co 1st Mtge Series A 4½s Mar 1 1961		970 00	42 50		
1 000 Koppers Company 1st & Col Trust Series A 4s Nov 1 1951		1 000 00	40 00		
1 000 Lone Star Gas Corp 3½s S F Deb Aug 1 1953 Temp Ctf		1 020 00	2 92*		
2 000 Metropolitan Ice Co 1st Mtge. Se ries A 7s Jan. 1 1954		2 100 00	140 00		
1 740 National Bondholders Corp Paruc Cert. (in default)		1 740 00			
1 000 N Y Central R.R. S F 3½s April 1 1946 (secured)		980 00	37 50		
1 000 N Y Chicago & St. Louis R.R. Co 1st Mtge. 3½s extended to Oct 1 1947		937 50	35 00		
750 N Y Chicago & St. Louis R.R. 6% Notes Oct. 1 1938 (deposit re ceipts)		750 00	45 00		
2 000 Ohio Edison Co 1st Mtge. 4s Sept 1 1967		2 010 60	80 00		
1 000 Peoples Gas Light & Coke Co 1st & Ref. Series D 4s June 1 1961		975 00	40 00		
1 000 Pittsburgh Cincinnati Chicago & St Louis Ry Co 4½s Series A Oct 1 1940		1 048 75	6 75*		
— Public Service Co of No Ill 4½s 1st Lien & Ref Series I July 1 1960 (called)					63 00
— Public Service Co of No Ill 1st & Ref 5s Oct 1 1956 (called)					200 00
2 000 So Pacific (Ore. Lines) 1st Mtge Series A 4½s Mar 1 1977					1 605 00
1 000 Texas Corp 3½s Deb June 15 1951					1 000 00
1 000 The Toledo Edison Co 1st Mtge 3½s July 1 1968					1 015 00
2 000 Tidewater Assoc Oil Co S F Deb 3½s Jan 1 1952					1,997 50
3 000 U S Cold Storage Co 1st Mtge R E. Gold 6s Jan 1 1945					3 000 00
— U S Rubber Co 1st & Ref 5s Jan 1 1947 (called)					100 00
1 000 U S Steel Corp 3½s Deb June 1 1948					1 000 00
— U S Steel Corp 3½s Deb June 1 1948 (sold)					15 62
2 200 U S A Treasury 3½s Oct 15 1945-43					2 200 00
— U S A Treasury 2½s, June 15 1938 (matured)					71 49
2 000 U S A Treasury 3½s Aug 1 1941					27 64
1 000 U S A Treasury 3½s Oct 15 1945-43					65 00
2 000 U S A Treasury 3½s Oct 15 1945-43					1 015 00
1 000 U S A Treasury 1½s Series A Mar 15 1941					32 50
3 000 U S A Treasury 1½s Series A Mar 15 1942					2 026 25
1 000 The Virginian Ry Co 1st Lien & Ref Mtge. Series A 3½s Mar 1 1966					65 01
1 000 Western Mass Co 3½s Note due June 15 1946					1 000 00
3 000 Wilson Co Inc Series A 1st Mtge 4s July 15 1955					15 00
— New England Journal of Medicine					3 003 44
					52.50
					1 022 50
					37 50
					1 012 50
					32 50
					3 000 00
					120 00
					1 00
Totals					\$103 354 72
Less bond premiums charged off					\$3 451 07
Net income					\$173 52
*Interest paid out					\$3 277.55
BUILDING FUND					
Balance January 1 1938					\$60 261 40
Additions					
Income from securities					\$1 716 21
Gift from a friend					1 000 00
Profit on securities sold					249 79
Total					2,966 00
Deduction					
Bond premiums charged off					\$63 77 40
Balance December 31 1938					42 75
					\$63 184 65
SCHEDULE B					
STATEMENT SHOWING THE REVENUE AND EXPENSES OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE TWELVE MONTHS ENDED DECEMBER 31 1938					
REVENUE					
Assessments Received by District Treasurers					
Barnstable					\$470 00
Berkshire					1 200 00
Bristol North					605 00
Bristol South					2 045 00
Essex North					2,231 00
Essex South					2 580 00
Franklin					420 00
Hampden					3 200 00
Hampshire					695 00
Middlesex East					1 210 00
Middlesex North					1 160 00
Middlesex South					9 310 00
Norfolk					7 660 00
Norfolk South					1 060 00
Plymouth					1 285 00
Suffolk					6 695 00
Worcester					3 880 00
Worcester North					9 000
					\$46 676 09
Assessments Received by Treasurer					1 614 09
Non Resident Assessments					1 482 09
Sale of Directories and History					58 54
Income from Funds					
Endowment funds					641 67
General Fund					3 277 55
Profit on Sale of Securities					3 919 72
Total Revenue					1 521 72
					\$55 777 95

## EXPENSES

<i>Salaries</i>			
Secretary	\$3 000 00		
Treasurer	1 000 00		
Executive assistant	1 946 20		
Editor emeritus of <i>Journal</i>	1 200 00		
		57 146 70	
<i>Expenses of Officers and Delegates</i>			
President	\$60.56		
Secretary	1,369 40		
Treasurer	248 54		
District treasurers	2 610 78		
Censors	771 00		
Delegates to American Medical Association	2 057 98		
		7 118 26	
<i>General Expenses</i>			
Maintenance of society headquarters (including clerical and other expenses)	\$4,341 87		
Shattuck Lecture	200 00		
Cotting Luncheons	290 00		
<i>Committee Expenses</i>			
State and National Legislation	\$1 840 13		
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Public Relations	207 86		
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Publications	.98		
		3 246 21	
Miscellaneous expenses	6 25		
		8 084 33	
<i>Refunds to District Societies</i>			4 000 00
<i>Standing Committees</i>			
<i>Publications</i>			
<i>New England Journal of Medicine</i>	\$21 000 00		
<i>Annual Directory</i>	1 572 93		
		\$27 572 93	
Medical Defense	1 129 76		
Committee on Postgraduate Instruction	602 76		
		24,304 95	
Total expenses			50 653 74
Unexpended Revenue			\$4 624 74

## APPENDIX NO 3

## REPORT OF THE TREASURER

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The Treasurer invites questions

CHARLES S BUTLER, *Treasurer*

## APPENDIX NO 4

REPORT OF COMMITTEE ON FINANCIAL PLANNING  
AND BUDGET

## BUDGET FOR 1939

The following appropriations are recommended

	Recommended for 1939	Appropriated in 1938
<i>Salaries</i>		
Secretary	\$3000	\$3000
Treasurer	1000	1000
Executive assistant	2000	2000
Editor of <i>Journal</i> emeritus	1200	1200
<i>Expenses of officers and delegates</i>		
President and vice president	500	500
Secretary	1400	1600
Treasurer	400	400
District Treasurers	700	2600
Censors	900	825
Delegates to House of Delegates American Medical Association	1500	2300
Maintenance society headquarters including clerical and other expenses	5060	5060
Shattuck Lecture	200	200
Cotting Luncheons	350	350
<i>Standing committees</i>		
Arrangements	1500	1600
Publications		
<i>New England Journal of Medicine</i>	20500	21500
<i>Directory</i>	500	2400
Membership and Finance	10	25

## GENERAL FUND

	Securities and Cash	Income	Premium Charged Off			
Cash Merchants National Bank	\$12 276 48			— Public Service Co of No III 4½s 1st Lien & Ref Series I July 1 1960 (called)		63 00
Cash New England Trust Co	7 180 28			— Public Service Co of No III 1st & Ref 5s Oct 1 1956 (called)		200 00
Deposit Franklin Savings Bank Boston	1 074 48	\$24 17		2 000 So Pacific (Ore. Lines) 1st Mtge Series A 4½s, Mar 1 1977	1 605 00	90 00
1 000 American Tel & Tel Co Deb 3½s Dec 1 1966	1 020 00	32 50		1 000 Texas Corp 3½s Deb June 15 1951	1 000 00	35 00
— American Tel & Tel Co Deb 3½s Dec 1 1966 (sold)		30 06		1 000 The Toledo Edison Co 1st Mtge. 3½s July 1 1968	1 015 00	4 25*
— Appalachian Electric Power Co 1st & Ref. 5s May 1 1956 (called)		55 41		2 000 Tidewater Assoc Oil Co S F Deb 3½s Jan 1 1952	1 997 50	70 00
4 000 Appalachian Electric Power Co 4s Feb 1 1963	3,950 00	75 56		3 000 U S Cold Storage Co 1st Mtge R E Gold 6s Jan 1 1945	3 000 00	180 00
2 000 Atlantic Coast Line R.R. Co 4s July 1 1952	1 503 04	17 22		— U S Rubber Co 1st & Ref 5s, Jan 1 1947 (called)		100 00
2 000 Bethlehem Steel Corp S F series E 3½s Oct 1 1966	1,970 00	75 00		1 000 U S Steel Corp 3½s Deb June 1 1948	1 000 00	15 62
3 000 Blackstone Valley Gas & Electric Co Series D 3½s, Dec 1 1968 Temp Bond	3 142 50	1 47*		— U S Steel Corp 3½s Deb June 1 1948 (sold)		13 18
1 000 Blackstone Valley Gas & Electric Co Series C 4s Nov 1 1965	1 025 00	40 00		2 200 U S A Treasury 3½s Oct 15 1945-43	2 200 00	71 49
2 000 Boston & Albany R.R. 1st 4½s April 1 1943 (guaranteed)	1,935 00	90 00		— U S A Treasury 2½s June 15 1938 (matured)		27 64
— Canadian National Ry Equip Series J 4½s May 1 1938 (guaranteed) (matured)		45 00	\$27 00	2 000 U S A Treasury 3½s Aug 1 1941	2 000 00	65 00
1 000 Canadian National Ry Equip Series J 4½s May 1 1939 (guaranteed)	1 015 25	22 50	30 00	1 000 U S A Treasury 3½s Oct 15 1945-43	1 015 00	32 50
1 000 Canadian Pacific Ry Equip Trust Series C 4½s Dec 1 1943	1 086 25			2 000 U S A Treasury 3½s Oct 15 1945-43	2 026 25	65 01
2,000 Cedars Rapids Mfg & Power Co 1st Mtge 5s Jan 1 1953	1 870 00	100 00		1 000 U S A Treasury 1½s Series A Mar 15 1941	1 000 00	15 00
2 000 Central Illinois Public Service Co 1st Mtge. Series A 3½s Dec. 1 1968	2 010 00	3 12*		3 000 U S A Treasury 1½s Series A Mar 15 1942	3 003 44	52 50
3 000 Central Power & Light Co 1st 5s Aug 1 1956	2 730 00	150 00		1 000 The Virginian Ry Co 1st Lien & Ref Mtge Series A 3½s Mar 1 1966	1 022 50	37 50
— Chesapeake & Ohio Equip Trust Series V 5s July 1 1938 (matured)		50 00	26.52	1 000 Western Mass Co 3½s Note due June 15 1946	1 012.50	32 50
2 000 Chicago Burlington & Quincy R.R. Co 1st Ref Series A 5s Feb 1 1971	2 155 70	55 28		3 000 Wilson Co Inc Series A 1st Mtge 4s July 15 1955	3 000 00	120 00
1 000 City of Buffalo Ref. 4 20% Sept 1 1939	1 005 00	42 00	20 00	— <i>New England Journal of Medicine</i> 1 00		
— City of Malden Note due Nov 9 1938 (collected)		13 17		Totals	\$103,354 72	\$3 451 07
2 000 City of Buffalo 2 60% July 1 1939	2 025 00	52 00		Less bond premiums charged off		173 52
— City of Quincy Note due Sept 21 1938 (collected)		10 79		Net income		\$3,277 55
— Commonwealth of Massachusetts 3½s Jan 1 1938 (reg.) (matured)		17 50	10 00			
— Commonwealth of Massachusetts 3½s July 1 1938 (reg.) (matured)		105 00	10 00			
1 000 Commonwealth of Massachusetts 3½s July 1 1940 (reg.)	1 035 00	35 00	20 00			
1 000 Commonwealth of Massachusetts 3½s Jan 1 1941 (reg.)	1 000 00	35 00				
1 000 Connecticut River Power Co 1st 3½s Series A Feb 15 1961	1 045 00	37 50				
2 000 Consolidated Edison Co of N Y Inc 3½s Deb Jan 1 1958	2 035 00	31.30				
2 000 Conveyancers Title Insurance & Mort gage Co 4½s Dec 1 1937 (in default)	2 000 00					
— Erie County 4s O t. 15 1938 (ma tured)		40 00	30 00			
— General Motors Accept Corp 3½s Aug 1 1951 (sold)		32 50				
— General Motors Accept Corp 3s Aug 1 1946 (sold)		23 09				
1 000 Georgia Power Co 1st Ref 5s Mar 1 1967	862.50	50 00				
3 000 International Paper Co Ref Series A 6s Mar 1 1955	3 076 00	180 00				
2 000 Great Northern Ry Co Gen Mtge B 5½s Jan 1 1952	1,932 50	110 00				
1 000 Great Northern Ry Co 1st & Ref 4½s July 1 1961	990.30	8 62				
1 000 Great Northern Ry Co Gen Mtge Gold Series I 3½s Jan 1 1967	975 00	37.50				
1 000 Jones & Laughlin Steel Co. 1st Mtge. Series A 4½s Mar 1 1961	970 00	42 50				
1 000 Koppers Company 1st & Col Trust Series A 4s Nov 1 1951	1 000 00	40 00				
1 000 Lone Star Gas Corp 3½s S F Deb Aug 1 1953 Temp Ctf	1 020 00	2 92				
2 000 Metropolitan Ice Co 1st Mtge. Se ries A 7s Jan 1 1954	2 100 00	140 00				
1 740 National Bondholders Corp Partic Cert. (in default)	1 740 00					
1 000 N Y Central R.R. S F 3½s April 1 1946 (secured)	980 00	37 50				
1 000 N Y Chicago & St Louis R.R. Co 1st Mtge. 3½s extended to Oct 1 1947	937 50	35 00				
750 N Y Chicago & St. Louis R.R. 6% Notes Oct. 1 1938 (deposit re ceipts)	750 00	45 00				
2 000 Ohio Edison Co 1st Mtge. 4s Sept 1 1967	2 010 00	80 00				
1 000 Peoples Gas Light & Coke Co 1st & Ref Series D 4s June 1 1961	975 00	40 00				
1 000 Pittsburgh Cincinnati Chicago & St Louis Ry Co 4½s Series A Oct. 1 1940	1 048 75	6 75				

## BUILDING FUND

Balance January 1 1938	\$60 261 40
Additions	
Income from securities	\$1 716 21
Gift from a friend	1 000 00
Profit on securities sold	249 79
Total	\$63 277 40
Deduction	
Bond premiums charged off	42 75
Balance December 31 1938	\$63 184 65

## SCHEDULE B

STATEMENT SHOWING THE REVENUE AND EXPENSES OF THE MASSACHUSETTS  
MEDICAL SOCIETY FOR THE TWELVE MONTHS ENDED  
DECEMBER 31 1938

## REVENUE

## Assessments Received by District Treasurers

Barnstable	\$410 00
Berkshire	1 200 00
Bristol North	605 00
Bristol South	2 045 00
Essex North	2 231 00
Essex South	2 580 00
Franklin	420 00
Hampden	3 200 00
Hampshire	695 00
Middlesex East	1 210 00
Middlesex North	1 160 00
Middlesex South	9,310 00
Norfolk	7 660 00
Norfolk South	1 060 00
Plymouth	1 285 00
Suffolk	6 695 00
Worcester	3 880 00
Worcester North	9 0 00
	\$41 076 00

## Assessments Received by Treasurer

Non Resident Assessments	1 614 00
Sale of Directories and History	1 489 00
Income from Funds	53 54
Endowment funds	
General Fund	641 67
	3 77 55
	3 919 72

## Profit on Sale of Securities

Total Revenue	\$52 752 22
	\$52 752 22



## EXPENSES

<i>Salaries</i>		
Secretary	\$3 000 00	
Treasurer	1 060 00	
Executive assistant	1 946 20	
Editor emeritus of <i>Journal</i>	1 700 00	
		\$7 146 20
<i>Expenses of Officers and Delegates</i>		
President	\$60 56	
Secretary	1 369 40	
Treasurer	248 54	
District treasurers	2 610 78	
Censors	771 00	
Delegates to American Medical Association	2 057 98	
		7 118 26
<i>General Expenses</i>		
Maintenance of society headquarters (including clerical and other expenses)	\$4,341 87	
Shattuck Lecture	200 00	
Cotting Luncheon	290 00	
<i>Committee Expenses</i>		
State and National Legislation	\$1 840 13	
Public Health	325 84	
Medical Education and Diplomas	88 73	
Membership and Finance	3 75	
Ethics and Discipline	53 66	
Obstetrics and Gynecology	147 00	
Public Relations	207 86	
Arrangements	578 26	
Publications	.98	
	3 246 21	
Miscellaneous expenses	6 25	
		8 084 33
<i>Refunds to District Societies</i>		4 000 00
<i>Standing Committees</i>		
Publications		
New England Journal of Medicine	\$71 000 00	
Annual Directory	1 572 93	
	\$22,572 93	
Medical Defense	1 129 76	
Committee on Postgraduate Instruction	602.26	
		24,304 95
Total expenses		50 653 74
Unexpended Revenue		\$4 624 24

## APPENDIX NO 3

## REPORT OF THE TREASURER

The Treasurer has had the same difficult problem, the past year, as for the previous two or three years,—perhaps even more acutely in 1938,—namely investing and re-investing the available funds of the Society. Interest returns on prime bonds are now lower than ever, due in part to large inflow of gold and in part to measures by U S Treasury Department. U S Government short paper has recently sold at no interest return and prime corporation bonds, with maturities within five to ten years are selling to net from 1½ to 2¾ per cent. The Treasurer looks ahead with much doubt. One result of these conditions has been that the Treasurer has carried a larger cash balance than necessary and this, in consequence, has reduced the income return from our invested funds which the Society should have received. It should be emphasized again, however, that the revenue from annual dues of fellows has been, as usual, the main source of income, making about 90 per cent of our total.

Revenues received, during 1938 from annual dues of resident fellows amount to \$48,290 showing a considerable increase over 1937. Adding to this the annual dues from non-resident fellows of \$1,489 makes the total income from dues \$49,779 the largest amount from this source ever received by the Society. Other revenues—invested funds, \$3,919.22 proceeds of sales of publications \$58.54 and profits from sales of securities \$1,521.22—amount to \$5,498.98. Therefore the Society's total revenue in 1938, not including income from the Building

Fund, was \$55,277.98. This is, again, the largest total ever received by the Society.

The Building Fund had a net income in 1938 of \$1,673.46, this is less than in 1937. But the Treasurer is glad to report a small profit of \$249.79 from sales of securities and a generous gift of \$1,000 to this fund from a loyal friend. The fund now has a book value of over \$63,000. In the fund, there are two issues of bonds, each of \$5,000, now for years in default, and hence with greatly reduced market values. The Treasurer recommends, for a clearer statement of this fund, that he be authorized to charge off, or reduce, the book values of these two issues, to their approximate present values. This mark-off would amount to \$8,000 for the two issues—one issue \$3,500, the other \$4,500. If the Council approves this, then the statement of the fund will show more accurately its value.

Expenses of the Society during 1938 totaled \$50,653.74. The activities of several committees for the protection of the health of the people, and for the good of the fellows of the Society were greater than ever before. All of us benefit thereby. There are not many items which can at present be reduced without curtailing the duties of the Massachusetts Medical Society, both the public and to our fellows.

The Treasurer ventures to offer a suggestion to the Council, namely, would it be proper to give the Orator a modest honorarium for his oration, from which we derive so much benefit, at the annual meeting?

The Society ends 1938 with unexpended revenues of \$4,624.24. Total assets now amount to \$190,307.36, an increase for the year of over \$9,000.

The Treasurer takes this opportunity to thank the officers of the Society and the district officers for their co-operation, and, especially, to thank the members of the office staff of the *New England Journal of Medicine* for their helpfulness and assistance.

The Treasurer invites questions.

CHARLES S BUTLER, *Treasurer*

## APPENDIX NO 4

REPORT OF COMMITTEE ON FINANCIAL PLANNING  
AND BUDGET

## BUDGET FOR 1939

The following appropriations are recommended

	Recommended for 1939	Appropriated in 1938
<i>Salaries</i>		
Secretary	\$3000	\$3000
Treasurer	1000	1000
Executive assistant	2000	2000
Editor of <i>Journal</i> emeritus	1200	1,000
<i>Expenses of officers and delegates</i>		
President and vice president	500	500
Secretary	1400	1600
Treasurer	400	400
District Treasurers	2700	2600
Censors	900	825
Delegates to House of Delegates American Medical Association	1500	2300
Maintenance society headquarters including clerical and other expenses	5000	5000
Shattuck Lecture	200	200
Cotting Luncheons	350	350
<i>Standing committees</i>		
Arrangements	1500	1000
Publications		
New England Journal of Medicine	7000	21500
Directory	500	2400
Membership and Finance	10	25

Financial Planning and Budget	25	
Ethics and Discipline	75	50
*Medical Education and Medical Diplomas	200	200
†State and National Legislation	3000	2000
Public Health	350	100
Malpractice Defense	2000	2000
Special committees		
Postgraduate Instruction	1000	1000
Physiotherapy	100	
Public Relations	250	1000
Cancer	0	0
Section of Obstetrics and Gynecology	150	250
Boston Better Business Bureau	50	0
Returns to district societies	4000	4000
Totals	\$53 860	\$56 500

\*Including expenses of delegate to annual congress at Chicago and prize offered to interns in Massachusetts.

†Including expenses of delegate to annual congress at Chicago

## APPENDIX NO 5

### REPORT OF THE COMMITTEE ON MEMBERSHIP

This committee recommends

1 That the following named seventeen fellows be allowed to retire as of December 31, 1938, under the provisions of Chapter I, Section 5, of the by laws

Barrett, Edward W, Medford  
 Brousseau, William G, Cambridge  
 Fischbein, Louis, Allston  
 Haslam, Frank A, Brookline  
 Hurd, Randolph C, Newburyport  
 MacCarthy, Francis H, Gilford, New Hampshire, with remission of dues for 1938  
 Mahoney, John L, St. Petersburg, Florida, with remission of dues for 1938  
 McKibben, William W, Miami, Florida, with remission of dues for 1937 and 1938  
 O'Brien, John C, Greenfield  
 Pollard, John W H, Groveland  
 Schmidt, Richard D, Dorchester  
 Shattuck, Albert M, Worcester  
 Sherman, Frank M, West Newton  
 Sternberg, Joseph E, Dorchester, with remission of dues for 1937 and 1938  
 Walker, Lewis M, Cambridge  
 Williams, Edward D, Easthampton, with remission of dues for 1937 and 1938  
 Worthing, Frank B, Chatham, with remission of dues for 1936, 1937 and 1938

2. That the dues of the following named four fellows be remitted under the provisions of Chapter I, Section 6, of the by-laws

Bill, Jose P, Wayland, 1936, 1937 and 1938  
 Campbell, Franklin E, West Medford, 1939  
 Gibson, David H, Cambridge, 1936 1937 and 1938  
 Rumrill, Samuel D, Springfield, 1937 and 1938

3 That the following named twenty four fellows be allowed to resign as of December 31, 1938, under the provisions of Chapter I, Section 7, of the by laws

Bray, Walter A, North Stratford, New Hampshire  
 Bufford, John H, Newton Highlands  
 Cameron, Donald E, Albany, New York  
 Carrano, Armand T, New York City, with remission of dues for 1938  
 Clark, Anne L, New York City  
 Costa, Domizio A, Revere (a member of the Board of Registration in Medicine)

Curtis, Robert D, Manchester, Vermont  
 Dawson, Raymond J, Methuen  
 Dean, Stanley R, Newtown, Connecticut  
 Giannestras, Nicholas J, Cincinnati, Ohio, with remission of dues for 1937 and 1938  
 Gordon, George K, Malden  
 Hammond, John W, Jr, Riverdale-on Hudson, New York, with remission of dues for 1937 and 1938  
 Hershenson, Bert B, Brooklyn, New York  
 Ledger, George H, Union City, Pennsylvania, with remission of dues for 1937 and 1938  
 Machaj, Stanley W, Portsmouth, New Hampshire  
 Overholser, Winfred, Washington, District of Columbia  
 Simons, Donald J, New York City, with remission of dues for 1938  
 Smillie, Wilson G, New York City, with remission of dues for 1938  
 Stewart, Roger E, Seattle, Washington  
 Tanner, Walter L, Morristown, New Jersey  
 Tooker, Harold C, Bloomfield, New Jersey  
 Toppan, Roland L, Newburyport  
 Webb, Harold R, Brunswick, Maine  
 White, Lucy N, Pawlet, Vermont

4 That the following named fellow be allowed to resign as of December 31, 1938, under the provisions of Chapter VII, Section 4, of the by laws

Shulman, David H, Brookline

5 That the following named thirty nine fellows be deprived of the privileges of fellowship under the provisions of Chapter I, Section 8, Clauses a and b of the by laws

Baker, Harold W, Boston  
 Baker, Max, Newmarket, New Hampshire  
 Balser, Charles W, Detroit, Michigan  
 Barnes, Harry A, Dedham  
 Baxter, Alfred E, Lowell  
 Bianco, Harvey H, North Adams  
 Black, George L, Lawrence  
 Burckel, Arthur W, Adams  
 Cohen, Lionel, Holyoke  
 Cort, Parker M, Springfield  
 Costine, Robert A, North Adams  
 Craig, Henry R, Eloise, Michigan  
 Cunha, Felix, San Francisco, California  
 DeAsis, Cesario, Cagayan, Philippine Islands  
 Donohue, Jeremiah J, Worcester  
 Ducey, William D, Brockton  
 Flynn, Joseph C, Providence, Rhode Island  
 Fox, Isadore, Boston  
 Harvey, Frank T, Milford  
 Hughes, George F, Somerville  
 Kasheta, Francis J, Warren, New Hampshire  
 Kelly, Daniel J, Adams  
 Kerkhoff, Edith, Attleboro  
 Kushner, Irving L, Somerville  
 Macnaughton, Elizabeth, Walpole, New Hampshire  
 McCartin, John E, Boston  
 Murray, George A, Dorchester  
 O'Brien, John F, Fall River  
 Peck, Eugene C, Leonardtown, Maryland  
 Pidgeon, Ira S, Waban  
 Pomerleau, Rodolphe J F, Augusta, Maine  
 Prenn, Joseph, Boston  
 Sherwood, Walter, Wellesley  
 Smith, Edward M, Exeter, New Hampshire  
 Sughrue, Dennis F, Dorchester  
 Sullivan, George M, Stoughton

Tait, Harold S, Palmer  
 Vuornos, Sirkka E., Liberty, New York  
 Wright, Katherine H. L., Erie, Pennsylvania

6 That the following named fellow be allowed to change his membership from one district society to another without change of legal residence, under the provisions of Chapter III, Section 3, of the by-laws

From Plymouth to Suffolk

Murphy, William F, Scituate Harbor

#### APPENDIX NO 6

##### REPORT OF THE COMMITTEE OF ARRANGEMENTS

Under the enthusiastic and able guidance of Dr Charles A. Sparrow, of Worcester, local committees have been appointed, and arrangements for the annual meeting are well under way

Due to certain expenses necessarily incurred in a meeting outside of Boston and to the fact that a rent of \$600 is being charged for use of the Worcester Auditorium the Committee of Arrangements respectfully requests the Council to approve its estimate of \$1500 for expenses of the committee in conjunction with the one hundred and fifty-eighth annual meeting of the Society to be held in Worcester, June 6, 7 and 8, 1939

RICHARD P STETSON, *Chairman*

#### APPENDIX NO 7

##### REPORT OF THE COMMITTEE ON ETHICS AND DISCIPLINE

Since our last report to the Council the committee has held three meetings. We have considered twenty complaints, requests for information or charges of unethical conduct of fellows. It was necessary to hold three hearings in order to come to a satisfactory understanding of the complaints, and we have heard the charges of unprofessional conduct from one layman against a fellow.

One hearing was given to a fellow whose registration to practice medicine had been revoked by the Board of Registration in Medicine because of very serious irregularities in the management of a pregnancy. The conflicting nature of the testimony made it improbable that a board of trial would lead to a successful termination, and as the fellow offered his resignation the committee accepted it.

The second hearing was to a fellow, a former treasurer of one of the district societies, for gross carelessness in the handling of the district's funds. The matter has now been straightened out. It was voted that it was the opinion of the committee that all district societies should have an auditing committee to audit the treasurer's accounts yearly, or whenever a change in office takes place.

The third hearing was given to a fellow who was interested in the manufacture and sale of a secret medicinal product. We have had much correspondence with him in regard to this matter and he has now agreed to give up the manufacture and all interest in the product.

Practically all the complaints resolve themselves around the desire of fellows to obtain a greater advantage over their confreres in some way or other. They have been adjusted either by interview with the chairman or by correspondence with the physicians in question. We have been governed in dealing with these cases by the state-

ment regarding publicity which we gave to the Council a year ago

ROBERT L DeNORMANDIE, *Chairman*

#### APPENDIX NO 8

##### REPORT OF THE COMMITTEE ON PUBLIC HEALTH

The Committee on Public Health and its Subcommittee on Public Education beg leave to submit the following report.

The radio broadcasts apparently continue to be a useful method of public education. Following the October announcement in the *New England Journal of Medicine* and the daily press that the 'Green Lights to Health' would again be broadcast under the auspices of the State Department of Public Health and the Massachusetts Medical Society, the Subcommittee on Public Education received approximately two hundred requests from schools, associations, physicians and laymen for copies of the entire series. This unexpected demand forced the committee to exceed somewhat irregularly its appropriation because of the extra postage and stationery required to satisfy this demand. After explanation our efficient and kindly treasurer and his advisers found the means to meet these sudden and unexpected obligations.

The change of time of delivery of these broadcasts from 7:45 to 4:00 p m, which the radio station found it necessary to impose, has given us a diminished radio audience, but in spite of this, fan mail continues to come in and indicates that so far, with only about half of our broadcasts delivered, we have reached about 130,000 people in addition to the two hundred and fifty copies of the broadcasts mailed by request each week. It is interesting to note the subjects which have aroused the greatest interest. The largest response in the way of fan mail thus far has come after the broadcasts on 'Having a Baby the Right Way' by Dr Roy J. Heffernan, 'What to Eat and Why' by Dr Sara M. Jordan, 'Diabetes' by Dr Albert A. Hornor, and what is most suggestive of all as indicating the consumers' interest in medical care, the excellent broadcast of Dr Michael A. Tighe on 'Community Health Councils'. A sensible means of improving the distribution of medical care. This would seem to emphasize the fact that it would be wise for the Massachusetts Medical Society and its county societies to bestir themselves in stimulating and in aiding and abetting the formation of such community councils.

The committee wishes to thank the members of the Council for a better response this year to the committee's request for criticism, favorable or otherwise, of the broadcasts. At the October, 1937, meeting of the Council we distributed fifty addressed postals to members who promised to listen in. The total response was four, or 8 per cent. At the October, 1938, meeting of the Council we distributed a hundred addressed postals. The response thus far has been sixteen, or 16 per cent—not a very generous response but twice as large as last year. I am glad to report that these responses have been almost unanimously favorable.

In November 1938, the Massachusetts Department of Public Health was approached by a representative of one of the Boston daily newspapers in relation to the publication in its columns of articles written by physicians on the various aspects of present-day medicine. The Department of Public Health graciously consulted the Committee on Public Health of the Massachusetts Medical Society

as to the propriety of such a pioneer venture. After a combined meeting of representatives of the Department of Public Health, the president of the Massachusetts Medical Society, representatives of the standing committees of the Massachusetts Medical Society on public relations, legislation, ethics and discipline, and public health, and representatives of the Massachusetts Dental Society, it was unanimously voted to approve in principle such an undertaking. The Department of Public Health and the Committee on Public Health of the Massachusetts Medical Society were asked to explore the matter further along the lines suggested and approved at this combined meeting. This exploration revealed the fact that the final authority of the paper whose representative had proposed the plan was unable or unwilling to publish the articles proposed in a manner which seemed to the Department of Public Health and to the Committee on Public Health of the Massachusetts Medical Society to be consistent with medical ethics. Before this became apparent it had been ascertained that the deans of the three important medical schools, the directors of the large hospitals and the full time teachers of medicine and surgery were in sympathy with the plan and were willing to prepare articles for such public consumption. The editors of the *Boston Evening Transcript* were then interviewed, and readily agreed to publish a series of some sixty such articles in consecutive issues of their paper and to safeguard fully the ethics of the profession.

The members of the Council have doubtless read the editorial in the *New England Journal of Medicine* of December 16, 1938. The articles which have been appearing daily in the *Transcript* under the title of "A Doctor a Day" since December 19 have been roughly grouped into four series. The first series deals with training of a physician from his premedical education until he becomes a general practitioner, a specialist or a public-health officer. In the second series the public is told of what goes on in modern hospitals and of their many and varied services to medicine and nursing. In the third series the Department of Public Health describes its multitudinous activities in safeguarding the health of the citizens and in making it easy for the physicians of the State to obtain the complicated biochemical products which have become necessary for adequate practice. The fourth series not yet published will discuss certain diseases for which specific or partially specific methods of treatment have been discovered.

This is, so far as we know, the first time that physicians in any organized manner have tried in their own words and at first hand to tell the public what they think the public wants to know and ought to know about the practical aspects of medicine.

The State Department of Public Health and the Committee on Public Health of the Massachusetts Medical Society will welcome the constructive criticism of the Council of this undertaking. It has been surprisingly easy to put through because of the *pro bono publico* spirit which is especially prevalent in this community among the medical profession. So far as we can remember not a single physician has refused to write a requested article after the purpose of the plan was explained.

Many requests have already been made by physicians and laymen for the reprinting of the whole series in inexpensive brochure form under some such title as *Modern Medicine in Massachusetts*. One leading physician in the western part of the State has offered to purchase two hundred copies of such a brochure for use in his own private practice. We hope to be able to arrange for such a publication. Members of the Council can help us greatly in

this endeavor if they will write letters to the editorial office of the *Boston Evening Transcript* urging that such a brochure be made available. It would be still more effective if you could induce any of your patients or lay friends who have read the articles to write letters of this sort. The committee urgently requests your co-operation.

ROBERT B OSGOOD, *Chairman*,  
GERALD N HOEFFEL, *Secretary*

## APPENDIX NO 9

### REPORT OF THE COMMITTEE ON PERMANENT HOME

The Committee on Permanent Home of the Massachusetts Medical Society makes the following report.

We are indebted to our competent treasurer, Dr Charles S Butler, for the following financial statement.

The Building Fund on December 31, 1938, had a book value of \$63,184.65. In the above amount are included income in 1938 from securities of \$1,673.46, a gift from a friend of \$1,000.00 and a profit from the sale of several securities of \$249.79, making a gain in the book value of the fund since 1937 of \$2,923.25.

On January 10, 1939, your committee held a meeting with all members present except Dr Erwin C Miller. It is our belief that the Society is financially able to purchase a suitable house, especially in the present state of the market, and would be able to furnish the building. On the other hand, unless it was adjacent to the medical library, its value to members would be considerably diminished. As a club it would have small use if we may judge from similar medical buildings in other cities. It would add to our comfort if we could have a large, well furnished hall and suitable committee rooms, but with our present arrangements in the library building we manage reasonably well, if not ideally. It is the opinion of your committee that it would be wise to defer action until some favorable opportunity presents itself.

WILLIAM H. ROBES, *Chairman*

## APPENDIX NO 10

### REPORT OF THE COMMITTEE ON CANCER

Through the recognition of the special interest of the Massachusetts Medical Society and the Massachusetts Department of Public Health in cancer education, a suitable program for co-operative effort in the cancer field has been worked out, including the campaign plans of the Women's Field Army of the American Society for the Control of Cancer.

It is proposed that, in place of the enlistment drive which was attempted unsuccessfully by the American Society for the Control of Cancer two years ago, effort should be made to raise funds for the work of the American Society through social functions such as balls, teas and special moving picture shows. Seventy per cent of the money raised would be allocated by the Massachusetts Executive Committee of the American Society for the Control of Cancer for cancer education in this State, and 30 per cent would go to the American Society. It is felt that this will be a much more successful and satisfactory means of raising funds than that previously attempted.

During the year, it is planned that at least a portion of the funds raised be used for the publication of a book

covering the salient points of cancer knowledge and cancer education for distribution to the physicians of the State.

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SHIELDS WARREN, *Chairman*

# APPENDIX NO 11

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Norfolk South	Quincy
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Worcester	Milford
Worcester North	Fitchburg

The first session began on October 21 and the last one was held January 20. The remainder of the course will be given during the late winter and early spring. The final report of this work will be given at the next meeting of the Council. The committee wishes to report that the state and federal agencies have given valuable help. The instruction has held to the same high standards, and has improved, according to the reports of the district chairmen. The committee wishes to express particularly the thanks of the Society for the active co-operation of the United States Public Health Service and the State Department of Health in providing a teaching collection of slides and a projection lantern, which have proved very helpful in presenting the courses in syphilis and gonorrhea.

The committee wishes to report further that clinical teaching in gonorrhea and syphilis has been established on a permanent basis in Boston and Springfield. This work has been made possible by the active co-operation of the Massachusetts Department of Public Health and the United States Public Health Service with the Society. This progressive step has been taken to meet the demands of practitioners for practical instruction in the diagnosis and treatment of these diseases. These teaching clinics were opened on December 1, 1938, and will continue twice a week for twenty-five consecutive weeks.

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At this meeting a tentative organization was formed called the Associated State Committees on Postgraduate Medical Education, with Dr James D. Bruce, of Ann Arbor, Michigan, chairman, and the secretary of the Massachusetts committee as secretary. The second meeting of these committees was held in San Francisco in June, 1938, during the meeting of the American Medical Association. Representatives attended from Florida, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Oklahoma, Oregon, South Carolina, Tennessee, Utah and Washing-

as to the propriety of such a pioneer venture. After a combined meeting of representatives of the Department of Public Health, the president of the Massachusetts Medical Society, representatives of the standing committees of the Massachusetts Medical Society on public relations, legislation, ethics and discipline, and public health, and representatives of the Massachusetts Dental Society, it was unanimously voted to approve in principle such an undertaking. The Department of Public Health and the Committee on Public Health of the Massachusetts Medical Society were asked to explore the matter further along the lines suggested and approved at this combined meeting. This exploration revealed the fact that the final authority of the paper whose representative had proposed the plan was unable or unwilling to publish the articles proposed in a manner which seemed to the Department of Public Health and to the Committee on Public Health of the Massachusetts Medical Society to be consistent with medical ethics. Before this became apparent it had been ascertained that the deans of the three important medical schools, the directors of the large hospitals and the full time teachers of medicine and surgery were in sympathy with the plan and were willing to prepare articles for such public consumption. The editors of the *Boston Evening Transcript* were then interviewed, and readily agreed to publish a series of some sixty such articles in consecutive issues of their paper and to safeguard fully the ethics of the profession.

The members of the Council have doubtless read the editorial in the *New England Journal of Medicine* of December 16, 1938. The articles which have been appearing daily in the *Transcript* under the title of "A Doctor a Day" since December 19 have been roughly grouped into four series. The first series deals with training of a physician from his premedical education until he becomes a general practitioner, a specialist or a public health officer. In the second series the public is told of what goes on in modern hospitals and of their many and varied services to medicine and nursing. In the third series the Department of Public Health describes its multitudinous activities in safeguarding the health of the citizens and in making it easy for the physicians of the State to obtain the complicated biochemical products which have become necessary for adequate practice. The fourth series not yet published will discuss certain diseases for which specific or partially specific methods of treatment have been discovered.

This is, so far as we know, the first time that physicians in any organized manner have tried in their own words and at first hand to tell the public what they think the public wants to know and ought to know about the practical aspects of medicine.

The State Department of Public Health and the Committee on Public Health of the Massachusetts Medical Society will welcome the constructive criticism of the Council of this undertaking. It has been surprisingly easy to put through because of the *pro bono publico* spirit which is especially prevalent in this community among the medical profession. So far as we can remember not a single physician has refused to write a requested article after the purpose of the plan was explained.

Many requests have already been made by physicians and laymen for the reprinting of the whole series in inexpensive brochure form under some such title as *Modern Medicine in Massachusetts*. One leading physician in the western part of the State has offered to purchase two hundred copies of such a brochure for use in his own private practice. We hope to be able to arrange for such a publication. Members of the Council can help us greatly in

this endeavor if they will write letters to the editorial office of the *Boston Evening Transcript* urging that such a brochure be made available. It would be still more effective if you could induce any of your patients or lay friends who have read the articles to write letters of this sort. The committee urgently requests your co-operation.

ROBERT B. OSGOOD, *Chairman*,  
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## APPENDIX NO 9

### REPORT OF THE COMMITTEE ON PERMANENT HOME

The Committee on Permanent Home of the Massachusetts Medical Society makes the following report. We are indebted to our competent treasurer, Dr. Charles S. Butler, for the following financial statement.

The Building Fund on December 31, 1938, had a book value of \$63,184.65. In the above amount are included income in 1938 from securities of \$1,673.46, a gift from a friend of \$1,000.00 and a profit from the sale of several securities of \$249.79, making a gain in the book value of the fund since 1937 of \$2,923.25.

On January 10, 1939, your committee held a meeting with all members present except Dr. Erwin C. Miller. It is our belief that the Society is financially able to purchase a suitable house, especially in the present state of the market, and would be able to furnish the building. On the other hand, unless it was adjacent to the medical library, its value to members would be considerably diminished. As a club it would have small use if we may judge from similar medical buildings in other cities. It would add to our comfort if we could have a large, well furnished hall and suitable committee rooms, but with our present arrangements in the library building we manage reasonably well, if not ideally. It is the opinion of your committee that it would be wise to defer action until some favorable opportunity presents itself.

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Through the recognition of the special interest of the Massachusetts Medical Society and the Massachusetts Department of Public Health in cancer education, a suitable program for co-operative effort in the cancer field has been worked out, including the campaign plans of the Women's Field Army of the American Society for the Control of Cancer.

It is proposed that, in place of the enlistment drive which was attempted unsuccessfully by the American Society for the Control of Cancer two years ago, effort should be made to raise funds for the work of the American Society through social functions such as balls, teas and special moving picture shows. Seventy per cent of the money raised would be allocated by the Massachusetts Executive Committee of the American Society for the Control of Cancer for cancer education in this State, and 30 per cent would go to the American Society. It is felt that this will be a much more successful and satisfactory means of raising funds than that previously attempted.

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We reverted to the basis upon which the idea of ward service was originally established, and has continued to function for many years. We found that this ward service had been established on the basis that there were in our community certain people who could pay no hospital charges at all or who could pay charges which were considerably below actual hospital costs. Our hospitals, being organized under the law which classified them as charitable institutions, wished and felt obligated to care for such people, even to the extent of gambling on the actual payment itself of these below-cost charges.

In consequence of this, certain doctors agreed to care for these cases without monetary compensation. These doctors were designated as staff doctors of the institution in which they served. Their reward came entirely from a sense of having been helpful to the poor, and from the experience which came with the care of large numbers of people.

And so it appeared to us that when we and our forbears had agreed to care for ward patients without pay, we did so under certain very definite and well understood circumstances.

We believed that when our hospitals became signatory to this new ward plan as offered by the Associated Hospital Service Corporation there would no longer prevail these old circumstances under which we had been giving our services free to ward patients—at least as they related to ward patients covered under this new insurance contract. We noted that the prices paid to hospitals for the care of these ward patients under the new contract were very considerably greater than the ward rates at present in force, that actual costs if not entirely met were nearly so, and that the gamble as to the payment of these costs had been entirely eliminated.

We felt, therefore, the circumstances having been changed, that we could not care for ward patients under this contract unless we were entirely free to decide in each specific case, and for ourselves, whether or not a bill for services should be rendered to them.

We, at first, approached the Associated Hospital Service Corporation in seeking to solve the difficulties which had arisen. We suggested to it that wherever the word 'ward' appeared in the member hospital contract, the word 'private' be made to precede it. This suggestion was not accepted. We next suggested that a sentence which appears in the hospital members' contract, and which reads as follows, 'The payment of physician's services shall be according to the staff rules of the hospital' be deleted and that the following language be substituted:

'Ward patients under this contract shall be understood to have the same status as that of private patients and subject to the same responsibility for payment for doctors' services. This suggestion likewise was not acceptable.

We next approached the administrative heads of our three general hospitals. It was at this point our difficulties were solved. These hospitals have now changed their staff rules. Any doctor in good standing, be he a member of the regular staff or of the courtesy staff, may care for these cases. He may accept whatever payment he and the patient agree upon as being fair. He is subject only to the hospitals' right, which they have always exercised, to determine the individual doctor's capacity to handle specific situations.

This statement must in no wise be construed as a criticism of the Associated Hospital Service Corporation. This corporation evidently had its own valid reasons for not meeting our requests. We still continue to give it our active support. We believe, however, that this experience emphasizes again the importance of being continually alert.

MICHAEL A. TIGHE

For the following committee

M. L. ALLING,  
D. J. ELLISON,  
A. R. GARDNER,  
J. H. LAMBERT,  
F. R. MAHONY,  
R. S. PERKINS,  
M. A. TIGHE

## APPENDIX NO 14

### REPORT FROM THE NEW ENGLAND ROENTGEN RAY SOCIETY TO THE COMMITTEE ON PUBLIC RELATIONS AND THE COUNCIL OF THE MASSACHUSETTS MEDICAL SOCIETY

A hospital insurance contract which proposes to sell the services of certain specialists in the practice of medicine along with bed and board of the patient has been printed, circulated, accepted by some hospital superintendents and offered to the public through the press without the approval of the Council of the Massachusetts Medical Society and the physicians most intimately concerned.

It is not clear that the approval of the Committee on Public Relations alone makes such a contract valid unless the same is submitted to and approved by the Council.

It is not our purpose to characterize the precipitateness with which this new contract has been launched as one of poor taste or bad faith because of inadequate consultation with those most interested, but we do desire to protest vigorously inclusion of roentgenology as a partial benefit in a hospital insurance scheme originally fostered and approved because no provision was made to sell physician's services.

It is an accepted fact established legally that the practice of roentgenology is the practice of medicine. If one specialty is included in this plan to make it more attractive and readily salable, then it is not a far cry to the inclusion of other specialties, twenty five dollars for a fracture, a maternity case, a tonsillectomy, an appendectomy or a pneumonia case.

You may say this will be guarded against by adopting the newly proposed insurance plan to pay for the physicians or surgeons services by cash benefits. Why then exclude the roentgenologist? He is a physician practicing medicine! Who shall separate the sheep from the goats? Not an insurance corporation, we hope, profit or non-profit!

The New England Roentgen Ray Society is not concerned primarily with the fact that the proposal in question may curtail the income of its individual members. Doubtless it will add to the income of many.

It is concerned with the fact that including ray examinations may injure the growth of the science of roentgenology, decrease the quality of the service to be offered patients, discourage the attraction of competent new matriculates in the field and seriously dislocate the relation now existing happily hereabouts for the most part between roentgenologists and the hospitals.

Roentgenology is something more than a kodak as

ton, representatives from the Council on Medical Education and Hospitals and the House of Delegates of the American Medical Association also attended this meeting. A permanent organization was effected with the above officers re-elected, and Dr Thomas P Farmer, of Syracuse, chosen as vice-chairman.

The clerical and incidental expenses incurred in connection with these meetings during the past two years, amounting to \$86.25, have been temporarily paid by the Massachusetts committee, but this money will be refunded to the Society by the associated committees after their annual meeting during the American Medical Association meeting in St. Louis next May. The work of this group is of interest and benefit to the whole profession, as it works in active co-operation with the Council on Medical Education and Hospitals and other bodies interested in this field. The committee considers that the Council should approve of this action of the committee, also the committee feels that the Society should send a delegate to the official meetings of the Associated State Committees on Postgraduate Medical Education.

The Council will be pleased to know that the Committee on Postgraduate Instruction was invited to give an exhibit at the American Medical Association meeting in St. Louis. The Committee on Educational Exhibits of the American Medical Association considers the Massachusetts postgraduate program of outstanding merit, however, due to the shortness of time and other factors this invitation was declined with thanks.

The committee makes the following recommendations:

- 1 That the committee be instructed to present a postgraduate assembly next fall, and that the other New England state medical societies be invited to co-operate in sponsoring such an assembly, if they so desire.
- 2 That the postgraduate extension courses and the teaching clinics be continued in co-operation with the government agencies, as has been done in the past.
- 3 That the chairman or secretary of the committee be instructed to attend the official meetings of the Associated State Committees on Postgraduate Medical Education.

FRANK R OBER, *Chairman*  
LEROY E PARKINS, *Secretary*

## APPENDIX NO 12

### REPORT OF THE COMMITTEE ON PUBLIC RELATIONS

The committee has held three meetings since the last Council meeting. Progress is being made in the establishment of district health councils, which were endorsed by you in June, 1936, and later urged by the trustees of the American Medical Association.

The Subcommittee on Social Legislation and Insurance is studying currently operating and proposed plans for medical indemnity insurance.

We have a special subcommittee to stimulate discussions leading to fundamental understandings between anesthesiologists, pathologists and roentgenologists and hospitals. This committee had not received reports from these groups in time for discussion at our last meeting. We believe that when these special groups can agree with hospitals on matters in controversy that insurance contracts will be adjusted to comply.

We call the following to your attention:

- A. The committee favored the extension of prepayment hospital service by the Associated Hospital

Service Corporation so as to include private ward patients. Where local practice does not now permit this service, permissive hospital regulations may perhaps be initiated, such as were consummated in Middlesex North under Dr Tighe's stimulus. Your district public relations member has a written report of how this was accomplished.

B. The committee has considered in principle a plan contemplated by the Associated Hospital Service Corporation for insurance to cover physicians' charges coincident with simultaneous insured hospitalization. We urge your endorsement of this principle and request your authorization to work out the details with the corporation—the plan to be initiated after agreement on its provisions.

C. The Farm Security Administration has plans (approved in principle by the Bureau of Medical Economics of the American Medical Association) providing loans to farmers for payment of doctors' bills. Approximately 700 families might be eligible for this service in Massachusetts. Twenty-one such plans are operating in the United States with approval of state and county medical societies.

The committee recommends your approval of this principle and asks authority to work out details which would be acceptable in Massachusetts, the plan to become operative after agreement on its provisions.

Two matters were referred by the Council for consideration:

(1) The recommendation by the American Medical Association that we establish in Massachusetts a Committee on Industrial Health. We recommend that the President be authorized to establish a special Committee on Industrial Health to proceed at once to study the problems in this field in Massachusetts.

(2) The suggestion of annual physical examinations for physicians under the sponsorship of the Massachusetts Medical Society is referred back to the Council without recommendation.

ELMER S BIGNALL, *Secretary*

## APPENDIX NO 13

### REPORT CONCERNING HOSPITAL RELATIONS UNDER THE NEW HOSPITAL INSURANCE CONTRACT

I am submitting, at the direction of the Committee on Public Relations of the Massachusetts Medical Society, the manner in which the staffs of Lowell's three general hospitals met the difficulties occasioned by the adoption of the Associated Hospital Service Corporation's new ward contract.

This corporation issues for each type of service sold two contracts, one to which the individual policyholder becomes a party, and the other which is signed by the member hospital furnishing the service.

In examining these two contracts of the same type, we find that the contract signed by the individual policyholder specifically said that services of attending physicians were not included in the benefits promised. In examining the contract of the member hospital we found the following language: "The payment for doctors' services shall be according to the staff rules of the member hospital."

The staff rules of our three hospitals forbade physicians

to charge for their services when rendered to ward patients.

It became apparent then that unless some change was made either in the language of the member hospitals' contract, or in the staff rules of our hospitals, physicians' services would, in fact, be included in the benefits which the individual policyholder received under his ward contract.

We reverted to the basis upon which the idea of ward service was originally established, and has continued to function for many years. We found that this ward service had been established on the basis that there were in our community certain people who could pay no hospital charges at all or who could pay charges which were considerably below actual hospital costs. Our hospitals, being organized under the law which classified them as charitable institutions, wished and felt obligated to care for such people, even to the extent of gambling on the actual payment itself of these below-cost charges.

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We believed that when our hospitals became signatory to this new ward plan as offered by the Associated Hospital Service Corporation there would no longer prevail these old circumstances under which we had been giving our services free to ward patients—at least as they related to ward patients covered under this new insurance contract. We noted that the prices paid to hospitals for the care of these ward patients under the new contract were very considerably greater than the ward rates at present in force, that actual costs if not entirely met were nearly so, and that the gamble as to the payment of these costs had been entirely eliminated.

We felt, therefore, the circumstances having been changed, that we could not care for ward patients under this contract unless we were entirely free to decide in each specific case, and for ourselves, whether or not a bill for services should be rendered to them.

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Ward patients under this contract shall be understood to have the same status as that of private patients and subject to the same responsibility for payment for doctors' services. This suggestion likewise was not acceptable.

We next approached the administrative heads of our three general hospitals. It was at this point our difficulties were solved. These hospitals have now changed their staff rules. Any doctor in good standing, be he a member of the regular staff or of the courtesy staff, may care for these cases. He may accept whatever payment he and the patient agree upon as being fair. He is subject only to the hospitals' right, which they have always exercised, to determine the individual doctor's capacity to handle specific situations.

This statement must in no wise be construed as a criticism of the Associated Hospital Service Corporation. This corporation evidently had its own valid reasons for not meeting our requests. We still continue to give it our active support. We believe, however, that this experience emphasizes again the importance of being continually alert.

MICHAEL A. TIGHE

For the following committee

M. L. ALLING,  
D. J. ELLISON,  
A. R. GARDNER,  
J. H. LAMBERT,  
F. R. MAHONY,  
R. S. PERKINS,  
M. A. TIGHE

#### APPENDIX NO 14

##### REPORT FROM THE NEW ENGLAND ROENTGEN RAY SOCIETY TO THE COMMITTEE ON PUBLIC RELATIONS AND THE COUNCIL OF THE MASSACHUSETTS MEDICAL SOCIETY

A hospital insurance contract which proposes to sell the services of certain specialists in the practice of medicine along with bed and board of the patient has been printed, circulated, accepted by some hospital superintendents and offered to the public through the press without the approval of the Council of the Massachusetts Medical Society and the physicians most intimately concerned.

It is not clear that the approval of the Committee on Public Relations alone makes such a contract valid unless the same is submitted to and approved by the Council.

It is not our purpose to characterize the precipitateness with which this new contract has been launched as one of poor taste or bad faith because of inadequate consultation with those most interested, but we do desire to protest vigorously inclusion of roentgenology as a partial benefit in a hospital insurance scheme originally fostered and approved because no provision was made to sell physician's services.

It is an accepted fact established legally that the practice of roentgenology is the practice of medicine. If one specialty is included in this plan to make it more attractive and readily salable, then it is not a far cry to the inclusion of other specialties, twenty five dollars for a fracture, a maternity case, a tonsillectomy, an appendectomy or a pneumoma case.

You may say this will be guarded against by adopting the newly proposed insurance plan to pay for the physicians or surgeons services by cash benefits. Why then exclude the roentgenologist? He is a physician practicing medicine! Who shall separate the sheep from the goats? Not an insurance corporation, we hope, profit or non-profit!

The New England Roentgen Ray Society is not concerned primarily with the fact that the proposal in question may curtail the income of its individual members. Doubtless it will add to the income of many.

It is concerned with the fact that including x-ray examinations may injure the growth of the science of roentgenology, decrease the quality of the service to be offered patients, discourage the attraction of competent new matriculates in the field and seriously dislocate the relation now existing happily hereabouts for the most part between roentgenologists and the hospitals.

Roentgenology is something more than a Kodak as

ton representatives from the Council on Medical Education and Hospitals and the House of Delegates of the American Medical Association also attended this meeting. A permanent organization was effected with the above officers re-elected, and Dr. Thomas P. Farmer of Syracuse, chosen as vice-chairman.

The clerical and incidental expenses incurred in connection with these meetings during the past two years, amounting to \$2625, have been temporarily paid by the Massachusetts committee, but this money will be refunded to the Society by the associated committees after their annual meeting during the American Medical Association meeting in St. Louis next May. The work of this group is of interest and benefit to the whole profession as it works in active co-operation with the Council on Medical Education and Hospitals and other bodies interested in this field. The committee considers that the Council should approve of this action or the committee also the committee feels that the Society should send a delegate to the official meetings of the Associated State Committee on Postgraduate Medical Education.

The Council will be pleased to know that the Committee on Postgraduate Instruction was invited to give an exhibit at the American Medical Association meeting in St. Louis. The Committee on Educational Exhibits of the American Medical Association considers the Massachusetts postgraduate program of outstanding merit; however due to the shortness of time and other factors this invitation was declined with thanks.

The committee makes the following recommendations:

1. That the committee be instructed to present a postgraduate assembly next fall, and that the other New England state medical societies be invited to co-operate in sponsoring such an assembly, if they so desire.
2. That the postgraduate extension courses and the teaching clinics be continued in co-operation with the government agencies, as has been done in the past.
3. That the chairman or secretary of the committee be instructed to attend the official meetings of the Associated State Committee on Postgraduate Medical Education.

FRANK R. OBER, *Chairman*  
LEROY E. PARKIN, *Secretary*

Service Corporation so as to include private ward patients. Where local practice does not now permit this service, permissive hospital regulations may perhaps be initiated such as were consummated in Middlesex North under Dr. Tighe's stimulus. Your district public relations member has a written report of how this was accomplished.

B. The committee has considered in principle a plan contemplated by the Associated Hospital Service Corporation for insurance to cover physicians' charges coincident with simultaneous insured hospitalization. We urge your endorsement of this principle and request your authorization to work out the details with the corporation—the plan to be initiated after agreement on its provisions.

C. The Farm Security Administration has plans (approved in principle by the Bureau of Medical Economics of the American Medical Association) providing loans to farmers for payment of doctors' bills. Approximately 700 families might be eligible for this service in Massachusetts. Twenty-one such plans are operating in the United States with approval of state and county medical societies.

The committee recommends your approval of this principle and asks authority to work out details which would be acceptable in Massachusetts, the plan to become operative after agreement on its provisions.

Two matters were referred by the Council for consideration:

- (1) The recommendation by the American Medical Association that we establish in Massachusetts a Committee on Industrial Health. We recommend that the President be authorized to establish a special Committee on Industrial Health to proceed at once to study the problems in this field in Massachusetts.
- (2) The suggestion of annual physical examinations for physicians under the sponsorship of the Massachusetts Medical Society is referred back to the Council without recommendation.

ELMER S. BAGNALL, *Secretary*

## APPENDIX NO. 12

### REPORT OF THE COMMITTEE ON PUBLIC RELATIONS

The committee has held three meetings since the last Council meeting. Progress is being made in the establishment of district health councils, which were endorsed by you in June 1936, and later urged by the trustees of the American Medical Association.

The Subcommittee on Social Legislation and Insurance is studying currently operating and proposed plans for medical indemnity insurance.

We have a special sub-committee to stimulate discussions leading to fundamental understandings between anesthetists, pathologists and roentgenologists and hospitals. This committee had not received reports from these groups in time for discussion at our last meeting. We believe that when these special groups can agree with hospitals on matters in controversy that insurance contracts will be adjusted to comply.

We call the following to your attention:

- A. The committee favored the extension of prepayment hospital service by the Associated Hospital

## APPENDIX NO. 13

### REPORT CONCERNING HOSPITAL RELATIONS UNDER THE NEW HOSPITAL INSURANCE CONTRACT

I am submitting at the direction of the Committee on Public Relations of the Massachusetts Medical Society the manner in which the staffs of Lowell's three general hospitals met the difficulties occasioned by the adoption of the Associated Hospital Service Corporation's new ward contract.

This corporation issues for each type of service and two contracts: one to which the individual policyholder becomes a party and the other which is signed by the member hospital furnishing the service.

In examining these two contracts of the same type, we find that the contract signed by the individual policyholder specifically said that services of attending physicians were not included in the benefits promised. In examining the contract of the member hospital we found the following language: "The payment for doctors' services shall be according to the staff rules of the member hospital."

The staff rules of our three hospitals forbade physicians

to charge for their services when rendered to ward patients.

It became apparent then that unless some change was made either in the language of the member hospitals contract, or in the staff rules of our hospitals, physicians services would, in fact, be included in the benefits which the individual policyholder received under his ward contract.

We reverted to the basis upon which the idea of ward service was originally established, and has continued to function for many years. We found that this ward service had been established on the basis that there were in our community certain people who could pay no hospital charges at all or who could pay charges which were considerably below actual hospital costs. Our hospitals, being organized under the law which classified them as charitable institutions, wished and felt obligated to care for such people, even to the extent of gambling on the actual payment itself of these below-cost charges.

In consequence of this, certain doctors agreed to care for these cases without monetary compensation. These doctors were designated as staff doctors of the institution in which they served. Their reward came entirely from a sense of having been helpful to the poor, and from the experience which came with the care of large numbers of people.

And so it appeared to us that when we and our for bears had agreed to care for ward patients without pay, we did so under certain very definite and well understood circumstances.

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MICHAEL A. TIGHE.

For the following committee

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Roentgenology is something more than a Kodak as

you go' process. It is an important part of the practice of medicine.

Already one supervisory insurance board dictates what kind of equipment and films the roentgenologist shall use and the number of films that may be exposed for any given condition!

In a few localities, hospital superintendents, encouraged unfortunately by the medical staff, have proposed that the roentgenologist be employed by the hospital for the sole purpose of supervising the technical production of x ray films, the interpretation to be made by any member of the visiting staff. This system is in actual operation not in an urban small community hospital but in a large metropolitan Midwest teaching hospital.

Don't assume the attitude it can't happen here! Within two weeks a contract was submitted to one of our large hospitals where technical expense and the roentgenologist were definitely divorced. To the credit of this hospital superintendent it was rejected!

Again let us reiterate that our opposition to the hospital insurance contract as now circulated is not for the purpose of perpetrating a monopoly but for that of protecting the quality and the survival of an important medical specialty.

We have no quarrel with the hospital that engages a competent radiologist or radiologists on a salary or fee basis. We recognize the right of the hospital that supplies equipment, floor space, light, heat and attendants to remuneration and depreciation. We believe that a reserve should be set up to provide new equipment and increase the remuneration of the physician specialists in charge. We do believe however that no x ray department should be operated at the expense of itself in equipment and personnel for the benefit of any other hospital service.

On behalf of the New England Roentgen Ray Society we respectfully direct your attention to the report of the Council on Medical Education and Hospitals (*J A M A* III 158, 1938) made to and accepted by the House of Delegates at the annual meeting of the American Medical Association in San Francisco concerning the relation of roentgenologists, pathologists and anesthetists to various hospital insurance plans. Several resolutions which were offered from various sections of the country were considered by the Council on Medical Education and Hospitals. The Council in its report said:

The proposers of these resolutions, the delegates from the Massachusetts Medical Society, members of the California Medical Association and others met with the Council to express their views concerning the problems that concern the practice of medicine in hospitals by radiologists, pathologists, and anesthetists. These problems have been rendered more acute by the rapid extension of systems of group hospital insurance within the last few years. The Council believes that these problems are of vital concern to the medical profession, that unwise decisions at this time may lead to consequences that would be disastrous to physicians and to the public alike, and that, therefore, a serious study should be made of existing relations between hospitals and the physicians practicing therein, especially in the departments of anesthesia, radiology and pathology, and physical therapy, with a view to standardizing the relation of these services to the hospital, and where necessary, of reaffirming the principles of ethics involved.

The Council recommends that it, jointly with the Bureau of Medical Economics, be authorized to undertake these studies and to confer with other interested agencies, in order that it may be in a position to establish ethical standards for the practice of medicine

by physicians holding positions in hospitals and to prevent the exploitation of either the public or the profession. If during this study it is revealed that hospitals registered and approved by the Council are exploiting the public or the profession such approval may be revoked.

This report of the Council on Medical Education and Hospitals was adopted by the House of Delegates of the American Medical Association. A suitable study is in progress and recommendations no doubt will be drawn up for submission to the House of Delegates at the next annual session in May, 1939.

Until new recommendations are made and until the House of Delegates has adopted them, the policy of the American Medical Association in relation to these matters remains unchanged. Should there be doubt as to its policy in this connection it is well to remember the action taken by the House of Delegates at San Francisco which reads:

Since some state and county medical societies may find it necessary to develop preferable procedures for supplying the needs where medical services are insufficient or unavailable, it is urged that these medical societies be guided in the development of these procedures by the ten principles adopted by the House of Delegates in 1934. The application of these ten principles to specific suggestions or proposals for the organization of medical services may be facilitated by utilizing the method of direct cash payments to individual members. Your committee unanimously concurs in the suggestion and recommends that the American Medical Association adopt the principle that in any place or arrangement for the provision of medical services the benefits shall be paid in cash directly to the individual member. Thus, the direct control of medical services may be avoided. Cash benefits only will not disturb or alter the relations of patients, physicians, and hospitals.

Your committee has considered in detail that portion of the report of the Board of Trustees devoted to the Bureau of Medical Economics under the heading Group Hospitalization and also the separate statement of the Bureau of Medical Economics entitled "Group Hospitalization Insurance." Your committee commends the clarity and forcefulness of these statements and recommends that the ten principles adopted in 1934 as the policy of the American Medical Association be amplified by the addition of the following statement to Principle 4:

If for any reason it is found desirable or necessary to include special medical services such as anesthesia, radiology, pathology or medical services provided by outpatient departments, these services may be included only on the condition that specified cash payments be made by the hospitalization organization directly to the subscribers for the cost of the services.

Disapproval of the inclusion of special medical services on a service basis in hospitalization insurance contracts will then be explicit but a constructive alternative arrangement will be possible.

These actions should make clear the point of view of the American Medical Association in this regard. The action taken by the House of Delegates in San Francisco holds that it is desirable to permit each person to receive the benefits from a hospital insurance system in cash so that he may purchase his own medical services from whatever source he may desire. When the individual

himself pays for the services he receives he can be assured of adequate and satisfactory services, otherwise he can refuse to make the payment. Under the cash-to-the-insured payment arrangement, which is the long-established method used by accident and health insurance companies, the insured person receives a definite number of dollars with which he can purchase services that are satisfactory to him. He does not have to accept whatever services may be offered by the insuring organization. The rights of the patient certainly are superior to those of the hospital, the corporation or any other interest.

In view of the study being made by the American Medical Association we, duly authorized to act on behalf of the New England Roentgen Ray Society, ask that the Committee on Public Relations and the Council of the Massachusetts Medical Society hold in abeyance final approval of any hospital insurance contract that attempts to sell physicians services until the combined committees of our parent national organization have reported and published their findings for our guidance.

CHARLES W BLACKETT,  
FREDERICK W O'BRIEN,  
FRANK E WHEATLEY \*

Committee elected at a regular meeting of the New England Roentgen Ray Society Friday January 20 1939

#### APPENDIX NO 15

##### REPORT FROM THE NEW ENGLAND SOCIETY OF ANESTHESIOLOGY

Medical service is still in the contract of the Associated Hospital Service Corporation in spite of repeated requests by the New England Society of Anesthesiology (formerly, Boston Society of Anesthetists). The Lane Resolution has not been recognized or considered by the Massachusetts Medical Society.

The new contract of the Associated Hospital Service Corporation is to go into effect today with medical service, including anesthesia, still included in its contract, after repeated requests through resolutions of the New England Society of Anesthesiology to have this medical service excluded. Dr Nathaniel Faxon stated January 12, 1939, that this was the result of a favorable report from the Committee on Public Relations to the effect that the pathologists, roentgenologists and anesthetists were in agreement as to their inclusion in the contract. On the same date the committee representing the anesthetists received a letter from Dr Frank Dunbar, chairman of a subcommittee of the Committee on Public Relations, asking for a report from the pathologists, roentgenologists and anesthetists as to the results of their conferences with the Hospital Council of the Massachusetts Hospital Association, which he stated was to be presented to the Committee on Public Relations for the benefit of the Associated Hospital Service Corporation in writing its new contract.

The anesthetists feel that the real issue in the matter is that anesthesia, being strictly a medical service should be excluded from any insurance contract. The anesthetists have taken this stand right from the start of the hospital prepayment insurance contract.

SIDNEY C WIGGIN, *Chairman*  
PHILIP D WOODBRIDGE,  
WILLIAM A NOONAN,  
Committee of New England Society  
of Anesthesiology

#### APPENDIX NO 16

##### REPORTS OF COMMITTEES APPOINTED TO CONSIDER RESTORATION TO FELLOWSHIP

Restoration to fellowship was recommended for the following five former members

Theobald C McSheehy, Worcester (Committee William F Lynch, Peter A Colberg and John M Fallon)

Thomas N Roche, New Bedford (Committee Thomas B Horan, Edwin D Gardner and Emil F Suchnick) The committee recommended that he pay \$10 plus the dues for the current year

Ruth Weissman, Boston (Committee Ralph R Stratton, Blanche L Atwood and Helen S Pittman)

Raymond C Whitney, New Bedford (Committee Aubrey J Pothier, Augustus H Mandell and Harold E Perry)

T N Zervas, Lynn (Committee Nathaniel P Breed, Stephen R Davis and John W Trask)

#### APPENDIX NO 17

##### COMMITTEES APPOINTED TO CONSIDER PETITIONS FOR RESTORATION TO FELLOWSHIP

The following committees were appointed to consider the petitions for restoration to fellowship of the following five former members

For E Olin Angell, Millbury  
Charles N Church, William B Clapp and Arthur A Brown.

For Israel Kaplan, Salem  
J Frank Donaldson, Leonard F Box and Arthur W O'Neil

For Horace G MacKerrow, Worcester  
Allen G Rice, Arthur W Marsh, Roy J Ward and Edwin R Leib

For John T H Powers, Greenfield  
Lawrence R Dame, Harry N Howe and Howard M Kemp

For Lewis Siegel, Somerville  
John A McLean, Edmund H Robbins and Edward J Dailey

#### APPENDIX NO 18

##### RESOLUTION PRESENTED BY DR. ERNEST L. HUNT

WHEREAS, within our population there is a considerable group who cannot be classed as indigent but whose incomes do not exceed a bare existence level and for whom adequate medical care other than through charity is not provided by any existing agency, and

WHEREAS, so far this Society has taken no effective steps toward a solution of this problem, and

WHEREAS, agencies outside the ranks of organized medicine are pressing for action looking to the provision of medical service for this low income group for which reason the initiative may pass from our control and result in

ill advised plans detrimental to patient and physician alike, be it therefore

ORDERED by the Council that the Committee on Public Relations (or a special committee of five appointed by the Chair) study the problems of medical service for this low-income group particularly in relation to voluntary insur-

ance, co-operative or contract service plans, determine the principles which this society may properly endorse, and secure or devise acceptable plans for furnishing and administering such medical service. This committee shall submit its report with recommendations to the Council at a subsequent meeting

## REPORT ON MEDICAL PROGRESS

### CLINICAL PATHOLOGY (LABORATORY MEDICINE)

WILLIAM T. SALTER, M.D.\*

BOSTON

AMONG physicians at large, there exists much disagreement about the status of clinical pathology. In a recent address on this subject, Maynard<sup>1</sup> has described the clinical pathologist as "a consulting physician whose chief interest lies in the diagnosis of disease by laboratory methods." Such a consultant is expected to aid in the diagnosis of diseases which differ as widely as cancer, typhoid fever and pernicious anemia. Whether such diversified problems should be included under one heading is problematical. If, as Maynard contends, "the clinical pathologist is a physician, not an overpaid technician," should not the laboratory procedures involved be entrusted to competent technicians under the supervision of physicians with active clinical interests and laboratory training? As Maynard himself points out, "it has been suggested that clinical pathology is a specialty only of convenience, not of necessity."

Apart from this administrative problem, however, it is clear that the information furnished by the six senses, including common sense, is being supplemented and confirmed by laboratory medicine in an ever-increasing degree. Almost every week an improvement appears which increases the accuracy or convenience of laboratory diagnosis. Most of these improvements are of interest only to the technically minded. In recent times, however, such advances have opened up for clinicians and general practitioners new methods of diagnosing and treating their patients.

#### DRUG LEVELS IN BLOOD

One such advance has been the measurement of sulfanilamide in the blood. The method of Marshall, Emerson and Cutting<sup>2</sup> has enabled the physician to know how well the body fluids of his patient are saturated with the specific medication. It has been amply demonstrated that concentrations of 10 mg per cent or higher are often de-

sirable. In gonorrheal arthritis, for example, Coggeshall and Bauer<sup>3</sup> have preferred to maintain the blood level close to 12 mg per cent, although occasionally concentrations as high as 20 mg per cent may be tried cautiously. Ordinarily the dose used is 0.07 to 0.10 gm per pound of body weight. Even with doses as large as 7 gm daily, however, it has been possible to guard against too heroic saturation of the system with a substance which is potentially toxic. This is feasible only through laboratory control. In cases of suppressed or impaired renal function, the drug must be used in small doses and with great care because in renal failure excretion is slow, and the drug remains to accumulate in body fluids. In the care of such cases the laboratory is especially important.

The method for estimating the concentration of the drug in body fluids is a simple colorimetric procedure. It depends on the formation of a purplish-red dye. This dye is made by diazotization of the aminobenzenesulfonamide with nitrous acid, followed by coupling of this diazo compound with dimethyl- $\alpha$ -naphthylamine. The reaction is given by many aniline derivatives, and serves, therefore, to indicate both the pure drug and its degradation products in the body.

The method is applicable to less than 2 cc of blood and to 1 cc of urine. Indeed, MacLachlan, Carey and Butler<sup>4</sup> have described a procedure which requires merely 0.1 cc of capillary blood. This modified method measures both the free and acetylated dye, and can be applied to the newer pyridine derivative by the use of an appropriate arithmetical factor. In human urine much of the drug is excreted in a conjugated form, which must be hydrolyzed with hot acid before the colorimetric method is performed.

Another example of controlled therapy is the estimation of blood bromide, as described by Brodie and Friedman<sup>5</sup>. This may be useful in the control of epilepsy and allied conditions. In

\*Assistant professor of medicine, Harvard Medical School; associate physician, Collis P. Huntington Memorial and Peter Bent Brigham hospitals.



general, symptoms of bromidism tend to occur when the bromide concentration in the blood serum exceeds 20 cc of N/10 bromide per 100 cc. Likewise, the use of thiocyanate can be regulated by analysis of the patient's blood.

This principle of measuring the concentration of medication in the blood is scientifically sound and will doubtless find application in other therapeutic procedures. Such methods correct for variations in absorption, destruction and excretion of drugs, and thus admit of better therapeutic control.

#### ENZYMES IN BLOOD

Another development of recent years has been the measurement of apparent enzyme concentration or activity in the blood. In particular, this technic has been applied successfully to two enzymes in ways which aid clinical diagnosis or therapy. The first of these is the measurement of phosphatase, the enzyme which hydrolyzes organic esters of phosphoric acid. Several procedures have been described for determining the apparent concentration or activity of this enzyme in the blood. The result is expressed in "units" per given volume of blood. The older units of Kay<sup>6</sup> and Bodansky<sup>7</sup> have been superseded in many clinics by the newer unit of Jenner and Kay.<sup>8</sup>

In Paget's disease (arthritis deformans), in hyperparathyroidism, in rickets, and in tumors involving bone, repeated phosphatase determinations serve not merely to confirm the diagnosis but also to gauge the activity of the disease at successive intervals of time. Thus in Paget's disease, the phosphatase may be normal during remissions. Phosphatase is also increased in certain liver diseases, particularly those associated with jaundice.

Recently Gutman and Gutman<sup>9</sup> have described an increased "acid" phosphatase activity in the serum, found in 11 of 15 patients with metastasizing prostatic carcinoma. It differs qualitatively from the "alkaline" phosphatase of the serum, but resembles closely the phosphatase of prostatic tissue.

The second enzyme is amylase, the enzyme concerned with the splitting of animal starch (glycogen) into glucose. Here again, the result is expressed in "units" per given volume of blood. For the determination, various modified procedures are available, of which that of Cope, Hagströmer and Blatt<sup>10</sup> is representative. Minor fluctuations are found in diabetes and after insulin or x-ray therapy. Low values are found in von Gierke's disease. The method's greatest usefulness is in the diagnosis of pancreatitis, cases of which show a remarkably high value for amylase, as described by Cole.<sup>1</sup> The importance of this finding is obvious in view of the desirability of conservative treatment in acute pancreatitis. Furthermore, repeated deter-

minations of enzyme activity serve to measure the progress of the lesion, when co-ordinated with other clinical findings.

Doubtless other enzymes will be measured and subjected to practical use in the near future. In developing methods for this purpose, it is necessary to remember that the effect produced by an enzyme is often not proportional to its concentration.

#### VITAMINS IN BLOOD AND URINE

Similar methods are being employed in the diagnosis of incipient avitaminosis and in vitamin therapy. Thus far, the method has been applied successfully to vitamin C only. For some years, however, such methods have been widely used with dubious or even fallacious results. A chief difficulty is that this vitamin exists in two forms, and the physiological significance of one—the dehydrogenated form—has not been determined. Another difficulty is that the reagent commonly employed to detect reduced vitamin C, namely dichlorophenolindophenol, is affected by substances other than the vitamin. Recently, however, the methods for urine have been improved by Evelyn, Malloy and Rosen,<sup>12</sup> and for blood by Mindlin and Butler.<sup>13</sup> The average serum level is approximately 0.8 mm per cent. In frank scurvy, practically no reduced vitamin C can be detected in the serum, as shown by van Eekelen<sup>14</sup> and others. Values between 0.2 and 0.5 mm per cent are of dubious significance. This is so because the concentration of reduced vitamin in the serum falls very rapidly when the vitamin has been withheld for only a short period.

In the milder cases of dietary deficiency, in the "twilight zone of vitamin lack" described by Minot, this method will doubtless prove of value. It may prove useful, too, in rheumatic and other infections, as suggested by Faulkner and Taylor.<sup>15</sup> Under ordinary clinical conditions at the present time, probably the safest procedure to employ is the study of the vitamin-tolerance curve described by Abbasy, Harris, Ray and Marrack<sup>16</sup> and others. When ascorbic acid is fed to normal individuals, much of it is rapidly excreted in the urine. On the contrary, patients who lack the vitamin retain the administered ascorbic acid and consequently fail to excrete much of it in the urine. Thus one may detect depletion of stores of ascorbic acid in the body.

Doubtless other vitamins will be measured in the blood through years to come, but none of them can be estimated accurately enough for clinical purposes at the present time.

#### ELECTROPHOTOMETRY

The application of the photoelectric cell to clinical laboratory methods bids fair to supplant the

visual colorimeter in clinical and research laboratories. At present all available electrophotometers are susceptible to improvement, but even now their usefulness is clearly apparent. Under suitable conditions, accurate readings can be made in a few seconds in concentrations too weak for the eye to detect. Furthermore, extraneous colors can be screened out by suitable light filters or by the use of a spectrophotometric system giving monochromatic light. These instruments will soon cost little more than colorimeters of comparable accuracy and will provide for a great saving of labor and time. Furthermore, they permit the application of methods unsuited to the colorimeters now available, and facilitate estimation of one tenth to one twentieth of the colored or chromogenic substance required for ordinary colorimetry. Indeed, the electrophotometer may be equipped with a micro attachment, which permits analysis of less than a cubic centimeter of final solution. For chemical tests in children and in small animals, this extension is helpful. It can also be used as a nephelometer to determine protein in spinal fluid or fat in blood plasma. In fact, the instrument is extremely sensitive to turbidity, and this fact must be remembered in applying it to colorimetric work. For detailed descriptions of such methods, one should refer to the articles of Evelyn and Malloy<sup>17</sup> and Sanford, Sheard and Osterberg.<sup>18</sup>

Other electrophotometers are available, and each has its respective appeal to the individual technician. Each of these instruments provides as nearly monochromatic light as possible in that region of the spectrum where maximum absorption is to be expected for the specific colored substance involved. The instrument then measures the amount of light absorbed through the action of a photoelectric cell, which is connected to a suitable electrical system containing a galvanometer. The concentration of the colored substance should be proportional to the logarithm of the light absorbed, according to the fundamental laws of Lambert and Beer.

This type of instrument has been applied to hematological procedures. It measures hemoglobin concentration within 2 per cent. This can be done even when methemoglobin is present, a circumstance which renders the Sahli method impracticable. In cases treated with sulfanilamide, this is a distinct advantage.

How far this type of instrument can be applied to clinical hematology is still a matter of conjecture. Various laboratory studies are in progress which suggest interesting possibilities. After hemorrhage, for example, in otherwise normal blood, the instrument can often be used to determine

"cell opacity." From this value the hematocrit can be calculated, under certain conditions. (A convenient routine is to measure the cell opacity, then, after adding a little saponin to hydrolyze the red cells, to measure hemoglobin.<sup>19</sup>)

It has been suggested that under favorable conditions the instrument might be used to count red cells or to determine red-cell diameter. Such attempts must at present be regarded with suspicion, however, because variation in size and shape of the red cells tends to distort the result seriously. Nevertheless, for those interested in investigation, the suggestion is intriguing. It will be recalled that in the last century, Thomas Young devised an "erometer," by which he measured the diameter of red blood cells, having calibrated his instrument with lycopodium spores. It is conceivable that the electrophotometer might be used to measure interference effects in this manner.

#### HEMATOLOGICAL PROBLEMS

The severe hemolytic crises occasionally produced by sulfanilamide present a difficult problem. Blood destruction is so profound that the bone marrow response projects many immature forms, such as megaloblasts, into the circulating blood. There is a clinical impression that transfusion at this time may be followed by untoward results, but the problem is not yet clear. Under such circumstances, of course, use of the drug should be discontinued.

The extensive use of sulfanilamide has also raised an interesting problem with regard to the severe cyanosis and anemia which it produces not infrequently. Originally these findings were supposed to be the result of methemoglobin or sulf hemoglobin formation. Recent studies by Chesley<sup>20</sup> and Hartmann, Perley and Barnett,<sup>21</sup> however, indicate that these substances are not the chief cause of the cyanosis. Indeed, in some cyanotic cases, nearly all the hemoglobin seems to be active in adding molecular oxygen. The actual mechanism of the cyanosis, therefore, remains obscure. It has been suggested that the color is due to an unusual black pigment, closely allied but not identical to methemoglobin. The spectral characteristics of the colored substance are essentially the same as those of methemoglobin; that is, both give absorption bands at 635  $\mu$ . Possibly the difference is due to the environment. At any rate, there is some evidence that the pigmentation may be reversed by administering methylene blue. Such observations remind one of the peculiar dark pigment described by Loeb, Bock and Fitz<sup>22</sup> in cases of nitrobenzene poisoning. Obviously, the problem has not as yet been solved, but it may be suspected that the ordinary methemoglobin of the biochem-

ical laboratory is not the chief reason in all cases for the characteristic cyanosis produced by the drug

In view of these hazards, which are described in a recent monograph by Mellon, Gross and Cooper,<sup>23</sup> it is clear that the drug should not be employed without close control. This implies hospitalization, or very close proximity to a hospital, and a progressive clinical laboratory. Whenever the drug is used, it is desirable to determine the red-cell count, the leukocyte count and the drug level in the blood every two or three days.

Transfusion technic is again under scrutiny. There are no new major difficulties involved, but rather the question of effectively guarding against well-known complications. This journal has recently published a letter<sup>24</sup> regarding the danger of incompatibility in transfusion.

The transfer of syphilis by transfusion, although an extremely uncommon accident, is receiving legislative attention. This complication usually occurs because blood is needed in an emergency and there is not time for the routine Wassermann or Hinton test, which may be reported positive several days later. In such exigencies the rapid flocculation method of Hinton,<sup>25</sup> or the micro modification of Davies,<sup>26</sup> may prove extremely useful. Hinton claims a high degree of accuracy for this simple method, which can be performed in a short time by one familiar with the technic. In this connection due regard must be paid to the so-called "zone phenomenon" when the Wassermann reaction is strongly positive, the Hinton reaction may be negative unless the serum is diluted. The micromethod has the further advantage, notable in children, that capillary blood is adequate in amount, and venipuncture therefore superfluous.

Attention should be directed again to the desirability of bone-marrow biopsy in the study of obscure anemias. To give best results, these must be properly performed and suitably handled by those familiar with the problem. One feature is the study of fresh impressions, which may be made upon slides or cover glasses by successive imprints from the excised tissue. These are fixed and stained like blood smears. The later imprints are progressively thinner, and allow one to choose appropriate fields for study. In view of time required for decalcification of the main specimen, these impressions are convenient and often highly illuminating.

#### MISCELLANEOUS PROCEDURES

In recent years a number of modifications have been introduced into standard diagnostic proce-

dures which have proved so valuable that it seems worth while to call attention to them again.

In routine blood-cell counting, the use of automatic pipettes is gaining ground. These ingenious devices are scorned by the trained technician and busy hematologist. For those practitioners who take only an occasional sample with their own hands, however, they are convenient. These pipettes have an inset capillary tube, the bore of which ends abruptly so that over-filling is avoided.

Gastric analysis has been reduced largely to a study of acidity. Many clinics use alcohol for the test meal because it is more convenient to remove and titrate than the usual test meal. In the event that no free acid is obtained in the initial sample, it is often desirable to stimulate the secretion of gastric juice by administering 0.5 to 10 mg of histamine subcutaneously. This material, in such doses, often produces a ready flow of gastric juice, which otherwise fails for nervous or other reasons. In cases of allergy the histamine should be used cautiously, because such patients may be hypersensitive to the drug and may react with acute asthma or other unpleasant symptoms.

In determining renal function, the application of Chapman's<sup>27</sup> fractional technic for measuring excretion of phenolsulfonephthalein has aroused widespread approval. This method emphasizes the appearance of the dye within the first fifteen or thirty minutes. Thus, of two cases yielding 40 per cent of the dye within an hour, the normal would show 10 + 20 + 5 + 5 per cent in four successive fifteen-minute intervals, whereas the pathologic case would show 10 + 10 + 10 + 10 per cent. The early rise in the excretion curve is evidence of normal function, its absence indicates limitation of function, even though the total excretion be normal. The method is best adapted to intravenous administration of the dye, but can be used satisfactorily in most cases after intramuscular administration. In the latter case, the time interval is altered to allow an extra ten minutes for absorption of the dye.

In nephritis the urea clearance as developed by Moller, McIntosh and Van Slyke<sup>28</sup> may be advantageous. No injection is required. Capillary blood is adequate. In cases with residual urine in the bladder, the method is more reliable than is the phthalein test. The application of this test clinically to urea excretion at low urine volumes has been recently discussed by Chesley.<sup>29</sup>

The old familiar urinary concentration test, of course, remains valuable, and various shortened procedures have been suggested to replace the elaborate methods like those of Schlaver. A convenient modification is described by Hunter<sup>30</sup> in

the new edition of the *Laboratory Manual of the Massachusetts General Hospital*. The procedure has been reduced to three specimens overnight, 7 to 8 a m in bed, and 8 to 9 a m ambulatory. These specimens are examined for specific gravity and albumin. Orthostatic albuminuria should be detected by the examination of the last specimen.

The Takata-Ara test for high globulin in body fluids seems doomed to abandonment in favor of the formol-gel test. This simple gel formation of a formalin-protein complex is useful as a qualitative test. It was first observed by Gaté and Papacostas<sup>31</sup> and has been applied in various modifications. Bing<sup>32</sup> has discussed the results obtained in Denmark by the following method. Two drops of 40 per cent formalin solution are added to 1 cc of serum in a small test tube. Three hours later the tube is inverted to test for complete gelification. Plasma must not be used, because the normal (globulin) fibrinogen reacts with the reagent. Hyperglobulinemia occurs in cases with multiple myelomas, kala-azar, liver disease, certain infections and, occasionally, lymphoma and lymphatic leukemia.

Another test of plasma protein is the falling-drop method, which in fact measures specific gravity. Moore and Van Slyke<sup>33</sup> showed a striking proportionality between the specific gravity of the serum and its protein content. Later Barbour and Hamilton<sup>34</sup> developed a falling drop method for determining specific gravity, and Kagan<sup>35</sup> has combined the two to determine the total protein content of plasma or serum. The principle is an application of Stokes' law, which states that the rate of fall of a small solid sphere in a viscous liquid depends on the radius and specific gravity of the sphere, the specific gravity and viscosity of the fluid, and the acceleration due to gravity. Under appropriately controlled conditions, the protein content of the drop may be determined from its rate of fall in a suitable oil. The amount of serum or plasma required is less than 0.05 cc.

This method is proving very satisfactory in the treatment of dehydration, whether by physicians or by surgeons. In addition to frequent determinations of serum protein, estimations of plasma sodium and chloride are desirable. Further details will be found in this *Journal* in a forthcoming review by Butler.<sup>36</sup>

In recent years the tryptophane reaction in the cerebrospinal fluid has attracted increasing attention. In 1927 Aiello<sup>37</sup> called attention to the presence of tryptophane in the cerebrospinal fluid of cases with tuberculous meningitis. The whole test can be performed in twenty minutes. The reagents contain hydrochloric acid, formaldehyde and

sodium nitrite. The positive test is read as a delicate violet ring, which is best observed in daylight against a white background. Falsely positive reactions are given by purulent, hemorrhagic and xanthochromic fluids. Spillane<sup>38</sup> has reported the results in 172 consecutive cases of various diseases. Of these, the test was positive in 30 of 32 cases of tuberculous meningitis. In 29 turbid fluids, the test was falsely positive. In all the remaining fluids the test was negative. Although the clinical value of this test has not yet been established, such preliminary reports justify extensive trial of it.

#### BOOKS

New books are constantly appearing on the subject of clinical pathology or laboratory medicine. Many of these are excellent reference books, and it is difficult to choose between them. Most of them have little to do, however, with procedures bordering on legal medicine and toxicology. Indeed for practitioners in small cities and rural communities there has been no up-to-date source of ready information of this sort in book form. This need is in a large measure met by Gonzales, Vance and Helpner's textbook<sup>39</sup> on legal medicine and toxicology, which is written in clear English and is well illustrated. Its section on carbon-monoxide poisoning is especially useful and interesting.

Another work of great value is Peters and Van Slyke's textbook<sup>40</sup> on clinical chemistry, which is published in two volumes. In the clinical laboratory this presentation of applied chemistry should be available for frequent reference. For a convenient handbook, the new *Laboratory Manual of the Massachusetts General Hospital*, edited by Hunter,<sup>30</sup> is very useful. This last book is in press, but will soon be available.

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# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25101

### PRESENTATION OF CASE

A fifty-year-old, unmarried Turkish grocer was admitted complaining of weakness and fever of four weeks' duration.

During the previous two months there had been a gradual loss of 40 or 50 pounds in weight, accompanied by malaise and diminishing strength. About five weeks prior to admission the patient had a cold, which was followed by mild persistent diarrhea. About a week later he began to experience increased weakness and fever, which continued until entry. At the time of onset of fever the patient entered an outside hospital where he remained for four weeks. His temperature fluctuated, reaching 101 to 102°F daily. His white blood-cell count was never over 14,000. The urine remained negative except for a very slight trace of albumin and a few white cells. He had no pain or tenderness. X-ray films showed a high diaphragm on the right. X-ray films of the gall bladder were negative. He had not had chills, pain, jaundice, edema, cough or dyspnea.

He was born in Turkey but moved to greater Boston at the age of twenty-one years. He had enjoyed good health until the onset of the present illness. Ten years ago a right mastoidectomy was performed. His past and family histories were otherwise noncontributory.

Physical examination showed a large, obese man, weighing 215 pounds, in no distress, but breathing heavily. The skin was moist and hot. There was a crusted papular rash on the legs below the knees, and marked intertrigo of the scrotum and groins. There were a few shotty inguinal nodes. Examination of the chest showed diminished expansion on both sides, more marked on the left. There were absent breath sounds and dullness over both bases posteriorly, but no rales. One examination stated that diaphragmatic excursion was limited on both sides, especially on the left. The heart was not enlarged, and there was a rough, short apical first sound with a suggestive brief systolic murmur. The blood pressure was 165 systolic, 80 diastolic. The abdomen showed bulging flanks and a probable fluid wave. There were no masses, no tenderness. Percussion showed generalized tympany. In the right scrotum there was

a transilluminable, soft, fluctuant mass measuring 4 by 5 by 6 cm.

The temperature was 101°F, the pulse 125, and the respirations 45.

A urine examination showed a specific gravity of 1.020 with a large trace of albumin and a rare white cell.

The blood showed a red-cell count of 4,400,000 with 80 per cent hemoglobin. The white-cell counts ranged from 8900 to 21,250, with 74 to 84 per cent polymorphonuclears. A blood Hinton test was positive, Wassermann negative. Two stool examinations were negative. An echinococcus skin test was negative. Typhoid, paratyphoid A and B, and undulant fever agglutination tests were negative. A blood culture showed diphtheroids in one flask and a contaminant gram-positive bacillus in the other. An electrocardiogram showed a rate of 140, regular. T<sub>1</sub> was slightly low, QRS slightly slurred. There was moderate left-axis deviation.

X-ray films of the chest showed an unusually high right diaphragm. There was hazy density above it, which obliterated the costophrenic angle. The remainder of the lung fields was clear. The heart was not displaced. X-ray films of the abdomen showed no free air beneath the diaphragm.

On the second hospital day a medical consultant stated that the patient was in a critical state and on the edge of delirium. The heart beat was rapid, regular and of ticktack quality. There was congestion of both lung bases. The abdomen was distended, peristalsis was active, but there were no signs of fluid. Liver dullness was absent, and the spleen was not palpable. During the following two days the patient had slight diarrhea. A warm stool examination showed numerous pus cells and red cells but no amebae. Cultures of this stool showed no pathogenic organisms. The spiking temperature continued. On the sixth hospital day the patient was transferred from the private wards to the general surgical service.

Physical examination was essentially unchanged. A medical consultant then suggested a malignant form of ulcerative colitis as a likely diagnosis. A surgical consultant believed that undulant fever was most likely. On the twelfth hospital day an emetin hydrochloride therapeutic test was begun. On the tenth hospital day x-ray films showed the diaphragm still high in position. Fluoroscopic examination showed fixation of the right diaphragm. There were linear areas of increased density in the right lower lung field, which appeared to represent areas of atelectasis. There was no definite evidence of fluid. An intravenous pyelogram was negative. There were no unusual abdominal soft tissue masses. A barium enema examination was nega-

On the tenth and eleventh hospital days blood cultures showed nonhemolytic streptococci in all flasks. On the fifteenth hospital day another blood culture showed nonhemolytic streptococci in one flask. At this time a gastrointestinal x-ray series showed the stomach to be high in position, but otherwise normal. The duodenal cap was large, smooth in outline, and emptied poorly by gravity. The duodenal loop showed a 2-cm diverticulum on the lesser curvature of the loop, but it was not otherwise remarkable. There was no evidence of organic disease in the stomach or small intestine. On the nineteenth hospital day a surgical consultant stated that his diagnosis was portal thrombophlebitis, with liver abscess or abscesses. He believed the appendix to be the etiologic focus.

The patient's temperature continued spiking daily from normal to 103°F. On the twentieth day a van den Bergh test was normal, indirect. On the twenty-first hospital day a third surgical consultant stated that subacute bacterial endocarditis was a tenable diagnosis, adding that a single liver abscess could not be ruled out. The following day another electrocardiogram showed a regular rate of 120. T<sub>3</sub> was flat. There was moderate left-axis deviation. The P-R interval was 0.16 seconds. On the twenty-fifth day a cardiac consultant found no evidence of enlargement of the heart, and no murmurs with the patient in various positions. The blood pressure was 115 systolic, 58 diastolic. He stated that he could find no evidence of heart disease. Two days later dullness was found at both lung bases, and frequent crackling rales, which could be attributed to the elevated diaphragm. The abdomen was soft and obese and showed no evidence of fluid. There was no tenderness anywhere. Several additional stool cultures showed no pathogenic organisms. On the twenty-ninth day x-ray films showed the diaphragm still elevated on the right, being about 5 cm higher than on the left. There was no respiratory motion on the right side. Linear areas of atelectasis were present in the right lower lung field, but there was no evidence of fluid in the pleural cavity. The heart was slightly enlarged. The aortic knob was calcified. The liver shadow did not appear to be enlarged. There was questionable enlargement of the spleen. Three days later a needle was introduced into the liver in three different places, but no pus or foci of resistance were encountered. On the thirty-seventh hospital day the patient complained of pain in the right ear. Examination showed a small perforation in the tympanic membrane which allowed a small amount of granulation tissue to protrude through, as well as a small amount of sero-sanguineous discharge. A culture showed beta

hemolytic streptococci and *Staphylococcus albus*. On the thirty-ninth day the patient was transferred from the surgical to the medical service.

Physical examination at this time showed an ill, exhausted man, breathing rapidly. There was a small hemorrhagic area on the left lower eyelid and another on the right buccal mucosa. An old right mastoid scar was present, and evidence of a right otitis media. At the base of the heart, just to the right of the sternum, a faint but definite diastolic murmur was heard, not present over the rest of the precordium. The heart action was rapid and vigorous. The first sound was reduplicated at the apex. The blood pressure was 155 systolic, 50 diastolic. No note was recorded relative to the character of the pulse. The liver was palpable but not enlarged. A definite mass palpated in the left upper quadrant was thought to be spleen. The skin over the right lower leg showed deposits of brownish pigment. A summary of the blood counts since admission showed red-cell counts varying from 4,200,000 to 5,080,000 with 80 to 84 per cent hemoglobin. The red cells were hypochromic. The polymorphonuclears showed a shift to the left.

On the forty-second hospital day the diastolic murmur over the aortic area was quite plainly audible. X-ray films of the mastoid processes showed a large operative defect on the right. The remaining cells in the antral triangle showed considerable sclerosis. On the forty-fifth hospital day, examination of the right ear showed a purulent discharge pulsating through a perforation in the lower central part of the tympanic membrane. The drum was thickened and red but not pushed outward. The mastoid scar showed no injection, swelling or tenderness. A second culture of the ear showed an abundant growth of *Staphylococcus albus* and a few colonies of beta hemolytic streptococci. The patient's fluctuating temperature and rapid pulse continued. Another blood Hinton test was reported unsatisfactory. Another blood culture showed nonhemolytic streptococci in both flasks. The van den Bergh test was normal, indirect. The patient gradually failed and died on the fifty-seventh hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR WILLIAM B. BREED. I am going to reverse the usual procedure here by offering one diagnosis and then endeavoring to see if it can be substantiated. I believe the patient had subacute bacterial endocarditis. In addition, he had otitis media which probably had no bearing on his disease in general, he had arteriosclerosis and calcification of the aorta, he had atelectasis at the right base, with a high fixed diaphragm. Before I try to

put forward supporting evidence there are certain discrepancies in observation which should be pointed out. This seemed to be another "gymnastic liver" like the ones referred to by Dr Mallory. There was certainly disagreement clinically, and x-ray study did not indicate that there was anything abnormal about the size of the liver. Then comes the question of ascites—there was considerable discrepancy between clinical opinions in this respect. My instinct leads me to say that there was no ascites, because when there is such doubt it is much safer to say that there is none. There is little said about the stool and the question of diarrhea, and although the record states that he had had some diarrhea, there was only one stool examination which showed pus and blood. The rest were negative, and there was no evidence of any pathogenic organisms or parasites.

Going back to the beginning, What are the facts that are perfectly consistent with a fundamental diagnosis of subacute bacterial endocarditis in this man? Weakness, fever and loss of weight following an upper respiratory infection are all right. The development during his three months' history of a diastolic murmur in the heart, the petechiae, the enlarged spleen and the positive blood cultures are all right, and I do not believe that we need more to establish that diagnosis. There are certain other facts that do not quite fit in with the diagnosis of endocarditis, the symptom of diarrhea being one of them. The more I read this history over the less impressed I was with that complaint, and inasmuch as only one stool showed pus and blood, I am inclined to put little emphasis on it. There was no anemia. That is another observation which one would like to have different. Progressive anemia would tend to substantiate the endocarditis more than a continuing good blood count. However, someone did note that the red cells were hypochromic.

DR TRACY B MALLORY. On the question of the number of stools, the chart indicates only one day with as many as three, and on the vast majority of days there was only one.

DR BREED. That is comforting.

Then we come to this high fixed right diaphragm. One can think of a number of things—*intrinsic* liver disease, amebic abscess, cancer, bronchiectasis and subdiaphragmatic abscess, and paralysis or injury to the right phrenic nerve—which might cause atelectasis. It seems unlikely that there would be a high fixation of the diaphragm due to atelectasis without change in the position of the mediastinum. Apparently the heart was not moved over. To say that he had no *intrinsic* disease of the liver or any serious disease below the diaphragm would be a guess.

My impression is that older people who develop subacute bacterial endocarditis usually have a more rapid course than do younger people. This was a fifty-year-old man whose disease lasted in all only three months. It is, to be sure, a rather rapid course for subacute bacterial endocarditis, in my experience, however, it is not unusual in the older group.

I should like to discuss these x-ray films more thoroughly with Dr Hampton and I should like particularly to have him explain to me, if he can, why the right diaphragm is high and fixed. That bothers me a good deal.

DR AUBREY O HAMPTON. It bothers me too. This is the examination done outside the hospital. The diaphragm was high at that time, and in this film taken two months later it is in the same position and still distinctly visible. I think that should mean that he has not a subphrenic abscess because by that time he ought to have had fluid in his chest.

DR BREED. Atelectasis of this degree would not of itself hold the diaphragm up without displacing the mediastinum, would it?

DR HAMPTON. The type of atelectasis that we see here is secondary to a high position of the diaphragm. The collapse of the whole lung would displace the mediastinum, but basal atelectasis such as this does not. In the lateral view the shape of the diaphragm is not what you usually see when it is fixed by inflammatory disease. The arc of the circle is not so short as it is here. The dome is flatter or more horizontal, and I think this is definite evidence that he did not have disease in the abdomen that caused elevation of the diaphragm. The liver shadow appears to have gone up with the elevated diaphragm in some of the films, and in others, if that is liver shadow, it is in normal position. I do not see why the gas in the bowel is higher than usual in this film, and in normal position in this one. I do not believe the diaphragm moves one day and does not the next. His left kidney is lower than the right, and I wonder if the liver and right kidney are not congenitally high, along with the diaphragm, for some cause which we do not know. I do not know whether paralysis of the diaphragm due to entrapment or to some injury of the phrenic nerve would result in this picture. The diaphragm does not move paradoxically. The left kidney may be lower than normal. I have no real explanation for this except that in one film we get a shadow which looks like the spleen in a low position. At one time he had a lot of gas in the small bowel, the next time none. I cannot place any lesion in his bowel or in the region of the cecum, although the cecum was contracted and on examination it



seems as though it was irritated by spasm or inflammatory disease, yet we see the small bowel which was perfectly normal and we have no evidence, later, of a spastic cecum

DR BREED Your phrase "congenitally high diaphragm" I have never heard before, but it sounds well I should like to leave it as a congenitally high diaphragm on the right!

The electrocardiogram does not really help very much It certainly does not indicate coronary disease. The changes I think could perfectly well be due to his illness I think I shall still rest on one diagnosis, namely subacute bacterial endocarditis, with the various other unconnected conditions, such as otitis media, arteriosclerosis with calcification of the aorta, and high right diaphragm (congenital!) to be mentioned

DR EDWARD D CHURCHILL In reviewing the history as a whole, I think it is difficult to realize how closely this man came to being operated on We were faced with the situation of a spiking fever, an elevated white count, only one of many blood flasks showing a nonhemolytic streptococcus, a high fixed diaphragm and the assurance of the medical consultants and the cardiac consultants that the heart was normal, as it was by examination at that time We did come to the point of putting in a needle to keep from overlooking subphrenic abscess Then while he was still a puzzle to us we transferred him to the medical service, although even at that time we were not sure whether he had concealed infection in his abdomen

DR ARLIE V BOCK I commend the men on the surgical service for the way they handled this case They did not go ahead with abdominal exploration, in spite of the fact that most of the time it looked as if the patient had sepsis in the abdomen He had a high fixed diaphragm, suggesting a subphrenic abscess The abdomen seemed normal except for the presence of a palpable spleen The thing against subphrenic abscess is the fact that no pleural fluid had accumulated, and I have yet to see such a case in association with active septicemia I saw him the day he was transferred to the medical service, and no heart murmurs were present before transfer The diagnosis became very easy after the appearance of the diastolic murmur It is interesting that he had only one or two small peripheral emboli There is a point Dr Breed did not mention the patient had subacute bacterial endocarditis with no evidence of any previous heart damage This, I think, is quite a rare finding

DR BREED We are finding more of these recently, especially in the older groups

DR EDWARD F BLAND Have you encountered any other lesion with repeatedly positive cultures that did not prove to be subacute bacterial endocarditis?

DR TRACY B MALLORY No, I have not

#### CLINICAL DIAGNOSES

Subacute bacterial endocarditis

Abscess of liver

#### DR. BREED'S DIAGNOSES

Subacute bacterial endocarditis

Aortic regurgitation

Septicemia (*Streptococcus viridans*)

Otitis media

Calcification of aorta

Congenital fixation of right diaphragm

#### ANATOMICAL DIAGNOSES

Subacute bacterial endocarditis involving aortic, mitral and tricuspid valves

Cardiac cirrhosis of the liver

Cerebral embolus with small infarct of occipital cortex

Arteriosclerosis, aortic and coronary

Splenomegaly

#### PATHOLOGICAL DISCUSSION

DR MALLORY This cardiac murmur rather miraculously developed in transit from the surgical to the medical wards It is not a question of difference between medical and surgical stethoscopes because none of the medical men heard the murmur on the surgical ward, but immediately after transfer they all heard it. From that moment the diagnosis was fairly obvious It remains from my point of view, however, a very puzzling case in a couple of ways His heart was moderately enlarged, weighing 460 gm, and he did have a bacterial endocarditis—a very extensive one with involvement of the aortic and mitral valves and very large vegetations on the tricuspid valve The lungs were free from infarcts There was merely slight focal atelectasis at both bases We found no reason for the "congenitally" raised diaphragm The spleen was quite large The surprising features of the autopsy were the liver and heart When we examine the heart closely in cases of subacute bacterial endocarditis we can almost invariably find evidence of previous damage, most commonly rheumatic heart disease but of course occasionally a congenital abnormality such as a bicuspid aortic valve In this patient there was nothing to suggest any previous lesion On the other hand the liver was cirrhotic and this cirrhosis was of a peculiar character Micro-

scopically it is a classical picture of so-called cardiac cirrhosis, the fibrosis being limited to the centers of the lobules. There was no periportal cirrhosis whatever. How a cirrhosis of that sort could develop except on the basis of repeated attacks of cardiac failure, I have no idea, and yet we have nothing in the heart to suggest previous heart disease and nothing in the clinical history either, for that matter. So we have a discrepancy in anatomic evidence which I am unable to explain.

DR BREED Did syphilis play a part?

DR MALLORY He had no anatomic evidence of syphilis.

### CASE 25102

#### PRESENTATION OF CASE

*First Admission* A thirty-one-year-old Finnish housewife was admitted complaining of profuse vaginal bleeding of six days' duration.

For the past year she had had intermenstrual low back pain and sharp pains in both right and left lower quadrants. Eight days before entry her regular catamenia began but continued until entry, with the passage of large clots. She was born in Finland, lived there seventeen years, then moved to Massachusetts. Physical examination was negative except for slight tenderness in the lower abdomen, tenderness over the entire perineum, retroversion of the fundus and profuse bleeding through the cervical os.

The blood showed a red-cell count of 3,100,000 with 65 per cent hemoglobin, and a white-cell count of 6800. A blood Hinton test was negative.

On the sixth hospital day a supravaginal hysterectomy was done which showed a 2-cm intramural leiomyoma.

She was discharged improved on the twentieth hospital day.

*Second Admission* (two weeks later) She had improved until three days before admission. After eating a rather large breakfast she noticed gas and epigastric discomfort. A sharp, agonizing pain in the epigastrium soon followed which seemed to be most severe over the right costal margin about 5 cm from the midline. It continued and radiated around to her back. She was tender over the right side. With the onset of the pain she vomited once, and ate nothing during the day. She was given two hypodermic injections but slept little because of the pain. On the third morning after onset she vomited some greenish material and felt partially relieved. She had two loose stools which were dark, but not tarry. A reinvestigation of her past history revealed that for the past ten years she had had attacks of moderate pain and tenderness in

the right lower quadrant lasting from half an hour to an hour and recurring at irregular, infrequent intervals. The pain was noted more often after eating fatty foods. She had been told at times by friends that her skin had a yellow tinge and had noted herself a similar color to the sclerae. Her stools had been normal and she had not vomited. Five or six years before admission a doctor had stated that she had a stone in the gall bladder.

Physical examination showed a well-developed and nourished, slightly jaundiced woman in obvious distress from severe pain. Examination of the chest was negative. The blood pressure was 125 systolic, 80 diastolic. There were tenderness and spasm in the right upper quadrant extending down to the level of the umbilicus. The gall bladder was not palpable. The remainder of the examination was essentially negative.

The temperature was 99.2°F, the pulse 85, and the respirations 23.

Examination of the urine was negative. The blood showed a red-cell count of 3,300,000 with 55 per cent hemoglobin, and a white-cell count of 6100 with 62 per cent polymorphonuclears. A blood Hinton test and spinal-fluid Wassermann test were negative.

X-ray films of the abdomen showed a stone in the region of the gall bladder or right kidney pelvis. A Graham test showed a large gall bladder filled with dense dye and a superimposed gas-filled duodenum. There were several small areas of decreased density near the fundus suggestive of gall stones. Repeat films of the right kidney showed an area of calcification in one of the middle calices, but it did not show in the lateral view. There was also moderate hydronephrosis on the right.

On the seventeenth hospital day a cholecystectomy with drainage was done. There was apparently an inflammatory cystic area in the septums between the right and left lobes of the liver. On the surface of this lay a thick-walled gall bladder, two thirds of its extent being unattached. The gall bladder was removed and showed no evidence of continuity with the cyst. It contained one 1-cm yellow brown stone. The common duct was normal. Medial to the gall bladder and continuous with the cystic area were several compressible diverticula. Inside these were multiple, impacted, rounded cystic stones measuring up to 3 mm in diameter, some containing fluid, some solid. The cyst contained 30 cc of watery, bile-stained fluid, which was not viscous. No small ducts could be found coming from the liver bed. Her jaundice cleared after operation, and she was discharged improved on the thirty-first hospital day.

*Final Admission* (nine months later) After operation she had moderate urinary frequency and constant dull pain in the right inguinal region but had no other complaints until eight days before entry when she experienced the onset of severe right upper-quadrant pain, which radiated in girdle fashion to the back beneath the scapulae and was accompanied by nausea and vomiting. The following morning her skin was yellow and she had generalized pruritus. Her stools were white, the urine dark. She had sensations of chilliness and fever. Vomiting and right upper-quadrant pain continued until two days before entry, when all her symptoms began to abate. At this time severe, intermittent pains developed across her lower back similar to those she had had before hysterectomy. Her right upper-quadrant pain, vomiting, light stools and chills were relieved. Her stools became black, which she attributed to eating blackberries.

Physical examination showed a slightly icteric, dehydrated woman in no pain. Examination of the chest was negative. The liver edge was palpated just beneath the costal margin, and 2 cm lateral to the operative incision there was a 2-cm round mass on the liver edge. Pelvic examination was noncontributory.

The temperature was 98°F, the pulse 80, and the respirations 20.

Examination of the urine showed bile, but was otherwise negative. The blood showed a red-cell count of 4,500,000 with 70 per cent hemoglobin, and a white-cell count of 9900 with 70 per cent polymorphonuclears. The serum nonprotein nitrogen was 27 mg per cent, the van den Bergh, diphasic, 712 mg per cent bilirubin, the chlorides 103 milliequivalents, the carbon-dioxide combining power 49.8 vol per cent, and the protein 7 gm per cent. An echinococcus skin test was negative. A gastrointestinal x-ray series was negative.

On the sixth hospital day her jaundice was decreasing. She had dull pain in the right upper quadrant. On the twelfth day duodenal drainage showed clear colorless fluid in which no bilirubin or cholesterol crystals were seen. Mucus and white cells were present in abundance. Two days later the blood bilirubin was 8.70 mg per cent. On the eighteenth day a laparotomy showed the liver to be of normal size and consistence. The spleen was not enlarged. The stomach was normal. The duodenum was bound to the liver by very dense adhesions. The pancreas was diffusely enlarged in its right half and was nodular. There was an irregular firm mass in the liver substance near the fissure. A contracted common duct was found, it had a diameter of 5 mm and con-

tained no bile. Sounds could be passed into the duodenum, but on passing them upward an obstruction was encountered at about the level of the bifurcation into the hepatic ducts. At this point there was a stenosis, following the dilatation of which with sounds there was a gush of bile. Just above the head of the pancreas there was a nodule which seemed to be an enlarged lymph node. A biopsy of this showed chronic inflammation.

On the second postoperative day the patient's temperature was 103°F, it returned to normal two days later. On the twenty-fifth hospital day the blood showed 17.40 mg per cent bilirubin. She had passed a brown stool, however, and seemed improved. Two days later she was severely jaundiced, the blood showing 31.3 mg per cent bilirubin and a direct van den Bergh reaction. The temperature was normal, but on the thirtieth day rose to 102°F. Three days later the prothrombin level in the blood was 45.9 per cent. Transfusions were given. On the thirty-fifth day she was bleeding from the wound and by rectum. The prothrombin level was 38.9 per cent. Vitamin K was given, and three days later the bleeding had stopped. The prothrombin level was then 64.3 per cent. On the fortieth day she developed signs of pneumonia at the right base. The sputum showed a very rare Type 3 pneumococcus. On the forty-eighth day the mouth showed ulcerations limited to the soft palate. She gradually failed and died on the forty-eighth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR LELAND S. MCKITTRICK: The first admission means nothing to me so far as the subsequent story is concerned. One might wonder why a 2-cm intramural leiomyoma made her bleed, but nevertheless she had a subtotal hysterectomy with uneventful convalescence, went home two weeks after operation, and nothing further that seems in any way related appears in the course of the history.

The second admission brings us down through the x-ray examination and does not stimulate a great deal of discussion. She has a history which I should feel was perfectly consistent with gallstone attacks or attacks of biliary colic. Her friends thought she had been yellow. On physical examination she was called slightly jaundiced although we do not have that confirmed by a blood bilirubin determination. From that story and from the situation up to the present time I must confess that if I were the surgeon who saw her I should be willing to accept her as having attacks of biliary colic. The x-ray would seem to suggest that she had gallstones, and I should be will-

ing to dismiss everything by saying that she had biliary colic and that operation was indicated

"Medial to the gall bladder and continuous with the cystic area were several compressible diverticula. Inside these were multiple, impacted, rounded cystic stones measuring up to 3 mm in diameter, some containing fluid, some solid." I suspect without going into too much discussion that the operator had a little difficulty in describing what he saw. If he did not, he has certainly had difficulty describing the lesion so that I can completely visualize it.

DR. TRACY B. MALLORY: Dr. Parsons is here. He might be willing to amplify the description, if you wish.

DR. LANGDON PARSONS: I cannot add anything. I found a thick-walled gall bladder. Behind it, lying between it and the liver, was this cystic triangular area in the interlobar fissure that contained bile-stained fluid. It did not look like true bile, however, and in the substance of the medial wall of the cyst were apparent diverticula. Each one of the diverticula had a little narrow neck and was packed solid with stones, some of which were translucent and broke in my fingers. There was one faceted stone in the gall bladder.

DR. MCKITTRICK: These were the stones that seemed to have fluid in them?

DR. PARSONS: Some contained fluid and some were solid. I did not open the common duct.

DR. MCKITTRICK: I dismissed the entire first part of this history unintentionally. I do not believe one can disregard her nationality. She was born in Finland and lived there for seventeen years. I had no intention of omitting that fact. I do not see how you can discuss this case without giving serious thought to echinococcus disease.

Let us pass to the operative findings as Dr. Parsons has discussed them. The one inconsistency that I can see, and I am sure it is an inconsistency, is that the patient was supposed to be jaundiced, and I should say that no very definite cause for jaundice was found at operation. She did have a gallstone, but she had a common duct that was essentially normal. I am inclined to believe that this 1-cm gallstone was not an important feature in relation to her real disease. It is very difficult for me to evaluate completely and to interpret exactly what Dr. Parsons found. Since this abstract arrived by mail yesterday I have been thinking a great deal about his findings. I cannot for the life of me think of any condition which is characterized by pain and by the finding of such a cystic mass, with its queer contents, except some manifestation of echinococcus disease. I do not know of any liver disease that would give

this sort of picture. You might say that it was a distended bile sinus and these were small stones. You cannot have a distended bile sinus unless you have mechanical obstruction along the biliary tract which will permit back pressure and distention. I do not believe that such a lesion is common, and it is excluded in this instance by the finding of a normal common duct and also by the absence of intense jaundice. So I find it difficult to accept this queer cystic area as being due to a dilated bile sinus, and I cannot help feeling that in some way this unusual finding at operation is associated with her early life in Finland. At the present time I feel obligated to accept the fact that this probably represents some manifestation of burned out echinococcus disease.

She was perfectly well for nine months after that. Here is where I am getting into trouble again. She had a few secondary symptoms which were of no great significance. But the important thing is that she again had a recurrence of severe right upper-quadrant pain, radiating in girdle fashion to her back beneath the scapula, accompanied by nausea and vomiting and followed by jaundice, clay-colored stools and dark urine. From that we must assume that this patient then had complete obstruction of the external biliary tract at some point, it was also associated with chilliness and fever, so I presume we could go a step farther and say there must have been an associated cholangitis. The record then states that the light stools and chills were relieved. I am not going to pay too much attention to the finding of black stools, because the finding of bloody stools might well represent mere oozing from some point in the intestinal mucosa secondary to her jaundice. It is a little hard to believe that all these findings could have been relieved in view of the further investigations, namely the finding of no bilirubin and no cholesterol crystals in the fluid obtained by duodenal drainage. If the tube was in the duodenum, have I a right to expect that there was no true bile coming through the ampulla, Dr. Jones?

DR. CHESTER M. JONES: Yes, I think that is the best test we have, provided that we are sure the fluid is colorless.

DR. MCKITTRICK: I have always considered it to be the best way of knowing whether or not bile was coming through the ampulla, although in this case it would not be in keeping with the statement above that the stools had regained their normal color. I think, however, that we can accept this as evidence of a complete block. There is one thing that does not reappear in the record, possibly because it was not an accurate clinical observation, the 2-cm mass in the region of the

incision does not seem to be mentioned any more. The liver was perfectly normal to touch, and there is no mention of a mass on physical examination.

We get into difficulty again with the record of the final operation. We are told that the liver was of normal size and consistence, the spleen was not enlarged, the stomach was normal, and the duodenum was bound to the liver by dense adhesions. The pancreas, however, is apparently coming into the picture. It was diffusely enlarged in the right half, and nodular. There was an irregular, firm mass in the liver substance near the fissure, and below this, a contracted common duct with a diameter of 5 mm, which contained no bile. That is entirely in keeping with the laboratory and physical findings of complete obstruction of the biliary tract. It is perfectly possible to have a collapsed bile duct with a mass in relation to the junction of the common hepatic and cystic ducts which occludes the external biliary tract at that point, so this is wholly in keeping with a complete block. Sounds could be passed downward into the duodenum and a common duct 5 mm in diameter which can be opened and into which sounds can be passed certainly excludes a so-called obliterative cholangitis and suggests that the obstruction was due to a localized rather than a diffuse process. When sounds were passed up the other way they met an obstruction above which was bile under pressure. We shall disregard everything in the past, for we are now faced with a patient with complete obstruction, due, I believe, to block of the external biliary tract which was probably caused by this mass which is palpated in the hilus of the liver in relation to the common hepatic bile duct. Moreover, associated with this is a nodular mass in the head of the pancreas. One lymph node was reported to show only chronic inflammation.

It seems to me we have two problems. The first is, Can we associate what was found at the second operation with what was found at the first? I think Dr Parsons will bear me out that the findings at operation the two times were quite different. Is that correct?

DR PARSONS: Yes.

DR McKITTRICK: In other words this queer cystic area had disappeared. There was in its place, in the region of the hilus and the common hepatic duct, a hard firm mass. A probe passed through the common duct to that region reached an obstruction beyond which was a dilated duct, so that this can be accepted as the point of obstruction. Associated with that was a nodular head of the pancreas. That brings up the ques-

tion, Is the past gone and over with and are we now dealing with a different process? Or, can there be some connection between the two? I am frank to confess I could discuss this case the rest of the day and not know more than I do now. I cannot associate the present finding with what was seen nine months before. How shall we answer this problem? I believe that the mass at the hilus was malignant. Whether it was primary or secondary to a cancer of the pancreas is more difficult to decide. It would seem to me that she must have had in the pancreas either chronic pancreatitis or carcinoma. As a rule it is impossible for an operator to distinguish between the two by palpation. I do not believe that the presence of chronic inflammation in the lymph node is of any significance one way or the other. It is impossible for me to make an accurate diagnosis, but I have to say something and it seems to me the diagnosis which fits the physical picture best is carcinoma of the head of the pancreas with metastases to a node at the hilus of the liver. On the other hand, because this diagnosis does not satisfy the previous findings I am forced to make a second one of echinococcus disease of the liver, now inactive.

#### CLINICAL DIAGNOSES

Cholangitis and obstructive jaundice  
Lobar pneumonia

#### DR. MCKITTRICK'S DIAGNOSES

Carcinoma of pancreas with metastasis to hilus of liver  
Cholangitis  
Echinococcus disease of liver, inactive

#### ANATOMICAL DIAGNOSES

(Cyst of liver, cholangiectatic)  
(Chronic cholecystitis)  
(Cholelithiasis)  
Carcinoma of extrahepatic bile ducts with metastasis to regional nodes  
Suppurative cholangitis  
Hydrothorax, bilateral.  
Pulmonary atelectasis, right middle and both lower lobes  
Icterus

#### PATHOLOGICAL DISCUSSION

DR MALLORY: I do not know whether there is anyone in the audience who has had more experience with echinococcus disease than we have had in this laboratory and can tell us whether the first cyst was consistent with echinococcus disease. The echinococcus cysts that I have seen have all had

a very characteristic wall, consisting of a so-called chitinous membrane, which is readily recognizable. There was no trace of any membrane of that sort. The wall of the cyst consisted mostly of dense fibrous tissue, but after cutting a good many sections we finally found a few columnar epithelial cells which suggested to us that it probably was a dilated bile duct. As to why the stones should have been cystic, I have no explanation. The original cyst remains considerable of a mystery to us still. At the autopsy we found the obstruction of the common duct at the junction of the two hepatic ducts, as recorded in Dr. Stewart's note describing the second operation. Sections through that area show carcinoma, whereas with the extensive dissection that is possible at the autopsy table we thought we could rule out cancer in the pancreas. There were nodes in the gastrohepatic ligament and near the head of the pancreas which contained tumor, but the pancreas itself was entirely free from tumor. So our final diagnosis was a primary carcinoma of the extrahepatic bile ducts. The liver at the time of autopsy was very large, weighed over 3000 gm, was studded with minute

abscesses and showed marked dilatation of all the intrahepatic bile ducts, in other words a characteristic picture of extensive cholangitis behind the point of obstruction.

DR. AUBREY O. HAMPTON: Were there any metastases to the lungs?

DR. MALLORY: No.

DR. HORATIO ROGERS: Do you think the black stools could have been caused by bleeding from the cancer in the bile ducts?

DR. MALLORY: I remember one case in which melena was apparently proved to be due to a cancer within the bile ducts. I think the more likely explanation would be that it was due to extensive petechial hemorrhages in the bowel in a severely jaundiced patient. This patient did have a low prothrombin level.

DR. GRANTLEY W. TAYLOR: Did the cyst at the original operation reaccumulate?

DR. MALLORY: It could not be recognized at autopsy. The space where it had been was occupied by a large abscess cavity, about 8 cm in diameter, which showed no characteristic lining of any sort.

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## IS THE MEDICAL PROFESSION OVERCROWDED?

It is sometimes claimed that the medical profession is overcrowded. The proponent of this claim is usually a member of the medical profession and the ground for the complaint is that there are many doctors, far too many, who are not able to make a comfortable living. If one employs in other fields the line of reasoning which has led to this conclusion one may well declare that the United States, not to speak of the earth, is overcrowded. It is an admissible hypothesis and it may prove after careful study to be sound for working purposes, but we want the facts, if facts there be, on which the hypothesis is predicated. The problem has not been subjected to the searching analysis which it deserves and satisfactory criteria for passing judgment have not been established. It is one of our 'vulgar errors,' as Sir

Thomas Browne might have said, to build our inductions on too narrow a foundation.

An obvious maladjustment in medicine and its social relations today is defective distribution of physicians. Still another defect, in the profession, is ignorance and lack of skill. Another defect, in society, is that the medical profession is not regarded with proper respect and confidence. Perhaps the profession as a whole gets about what it deserves—certainly the vogue of the cultist and of the patent-medicine vendor should not be passed over too lightly, with a sneer at the folly of mankind. It represents a difficult problem, to be approached in all seriousness there is no short cut to a changed world. It would be a simple matter to wipe out tuberculosis or syphilis in a generation, if it were not for human nature.

One lesson from preventive medicine is plain to all: if we save infants, there will be more persons to die in youth or in middle or advanced age. Why do we think there should be need of fewer physicians now than there were fifty years ago just because of the automobile and the telephone? It may be that we are demanding and getting a far higher level of medical service than did our grandfathers, and for this we may need more rather than fewer physicians.

There are many persons of keen intellect and marked proclivities toward efficiency who admire the marvelous progress in mass production of material things and who, envisioning the vast amount of medical service needed for the people of the United States in terms of material aggregations, seek to introduce methods of material efficiency into the practice of medicine. They will fail to accomplish even what they desire for they forget human nature, and the limitations in medicine of this type of efficiency are soon reached. This does not mean that there is not room for improvement. On the contrary, improvement in the quality of medical service is the most urgent need of today.

It has been said that medical schools should decrease their enrollment because there are too many doctors. If they ought to become smaller, it is not for this reason. The size of a medical school should be determined primarily by the number

of students who can be educated there at the highest possible level of quality of education. This, one must remember, is not a fixed level.

From bare statistical comparisons with other countries one might conclude, as has been done, that the United States has too many doctors per thousand of population, and also by the same token, too many telephones, too many automobiles, too many bath tubs. It is a fact that no one knows how many physicians there should be in the United States and any arbitrary limitation might prove to be a serious mistake. Perhaps if there were better physicians, even more would be needed to care adequately for the population. Our health is far from perfect!

Every effort should be made to improve the quality of medical education, and hence the quality of medical service, by assisting medical schools to increase their facilities in every practicable way. If any school is found which refuses to come up to the generally accepted level for contemporary medical education and persists in giving its degree to candidates without reasonable qualification it should be forcibly reminded that it is failing in its duty to the public.

### PRESENT-DAY PSYCHIATRY

THE Symposium on Mental Health held in December, 1938, at Richmond, Virginia, in conjunction with the American Association for the Advancement of Science, furnished an excellent summary of our modern thought on this difficult subject. The symposium, divided into six different sections, took up various aspects of the psychiatric problem in a way which had never been previously attempted. At the head of each section was a physician of outstanding importance in his field, and a summary of their conclusions, issued separately, forms an important document in the fight against mental disease.

Some of the points emphasized in this conference, although perhaps widely known, deserve to be brought again to the attention of the medical profession. The care of the mentally ill and the

advancement of research in psychiatry are two of the most important problems facing the medical profession. As one of the speakers pointed out, "despite the far-reaching advances in the treatment of the mentally ill in the past few years, patients enter mental hospitals in greater numbers than they go out, and we are faced with the prospect of a progressive increase in hospitalized mental disease." Thus the problem is one which is not getting smaller, and for a number of years to come it seems likely that more people rather than less will seek relief from their mental ills in properly equipped hospitals. Thus the better the service given, the more take advantage of it, until the time comes when the quality of the service is such that the disease begins to decrease, as it is gradually conquered. We appear to be far from that point in the evolution of psychiatric progress. Psychiatric research seems to be essential as "we need additional knowledge concerning the nature and causes of mental disease, which only sustained and systematic scientific investigation can give us." At the present time, in spite of the vast amount of money expended by private, state and federal funds, little vigorous research is carried on in mental hospitals, largely because of the inadequate staffs, the insufficient remuneration and a low clinical standard. Psychiatric research really should be a matter of public policy, for the public themselves are as much interested in this problem as are the physicians.

Another author, looking at the sources of mental disorder, pointed out that a large group of patients with mental disease are of the constitutional and hereditary type. Research in this matter has gone far enough to suggest certain remedial, hygienic and eugenic forms of treatment. Perhaps the most important suggestion comes in relation to the effort to make adequate and uniform marriage laws, thus preventing precipitous and ill considered matings. Along the same line is the suggestion of voluntary selective sterilization. Syphilis and alcohol, as other causes of mental disease, have already been fairly well attacked by a general program, which has the co-operation of all the



agencies involved in the problem. The lack of adequate nutrition, moreover, plays a role in mental disease much larger than ordinarily suspected by the average physician. In this land of plenty it is surprising to learn that a large part of the American population is not optimally nourished.

The problem, moreover, of the prevention and care of mental disease is closely allied to many social and economic aspects of our lives. Efforts are being made to conserve the values of family life by the proper placing of dependent children. Everything that tends, also, to increase the economic standard of the American family is undoubtedly a factor in the prevention of mental disease. Much has been done already by community organization and by federal aid. The value of the social-security project is certainly not to be minimized on the basis of the future mental health of the recipients.

Other research problems which interest the modern psychiatrist are those connected with cultural anthropology, social psychology and even political science. The more advanced statesmen are turning to psychiatry for help in some of their problems. Mention is made of the control of "integrative politics" by taking it over from those who lack insight and understanding of human needs. Attempts might be made to present the knowledge already gained in regard to psychiatric thought to aid "in the direction of human affairs and in countering the waves of propaganda and prejudice that block efforts at a scientific reform of our national life."

Finally, stress is laid on the fight against mental disease as a "totalitarian war in which all elements in the population must take their part. Propaganda must be employed, but what we want to propagate is the truth. It is the special role of those who are most closely associated with this special field of medicine to increase our body of knowledge as rapidly as possible, to give additional precision to the general principles which are gradually being outlined to bring the facts within this field of medicine into their natural relationship with other branches of science."

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### LACERATION OF THE CERVIX AND LOWER SEGMENT

Mrs. B., a thirty-year-old para II, entered the hospital January 7, 1938, at term and in active labor.

The family history was noncontributory. Her past history revealed an attack of bronchopneumonia in 1930 but no other medical diseases. In 1933 an appendectomy had been performed, and in 1935 she had had a complete amputation of the cervix for serious laceration resulting from her first delivery which was terminated by low forceps. She had had no abortions or miscarriages. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted four days without pain. Her last period was March 28, 1937, making her due for confinement January 2.

Physical examination showed the patient to be a well-developed and nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The blood pressure was 130 systolic, 80 diastolic. A postappendectomy scar was visible on her abdomen. Abdominal palpation showed a uterus at term, with a vertex presentation in the LOA position. The fetal heart rate was 130 in the left lower quadrant. The pelvic measurements were normal. The red-blood-cell count was 4,250,000 with a hemoglobin of 85 per cent (Tallqvist). The urine examination was negative.

Shortly after admission the membranes ruptured and the patient made rapid progress to full dilatation. An hour and a half after entry she was delivered normally of a 7 pound, 4 ounce, baby. After the birth of the baby there was more than a moderate amount of bright-red blood, and the placenta was immediately expelled. The bleeding continued after the birth of the placenta although the fundus was well contracted. Because of the amount of bleeding and because the fundus was well contracted, it was inferred that the bleeding must come from a laceration. In consequence the cervix was brought into view and a cervical rent was discovered on the left, which extended

\* A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

into the broad ligament. An attempt was made to suture this tear, and the vagina was packed tightly with sterile gauze. In spite of this, profuse bleeding continued. Intravenous glucose in saline was given, and prospective donors were summoned. The patient's pulse became alarmingly rapid and thready, her color became very poor, and her blood pressure dropped to 80 systolic, 60 diastolic. She quickly weakened from the loss of blood and died about forty minutes after the birth of the baby, before a transfusion could be given.

*Comment* This case of hemorrhage following normal labor was due to a considerable laceration of the cervix extending into the lower segment. The scar tissue resulting from a previous amputation of the cervix did not dilate. Scarred cervixes often tear but rarely in normal labor. The case was unique, too, in the amount of external hemorrhage, since lacerations of the lower segment are usually accompanied by little external bleeding. In such cases the diagnosis is made on the evidence of shock and hemorrhage without visible bleeding in a case in which the fundus remains well contracted after the birth of the placenta.

The attempt to stop the bleeding by suturing the torn cervix was unsuccessful. Undoubtedly a tear in one of the branches of the uterine artery was the cause of the bleeding. Immediate transfusion by replacing acute blood loss while further surgery, possibly hysterectomy, was resorted to might well have saved this patient's life. The routine grouping of patients, having a donor at hand and possibly the establishment of blood banks will make the handling of such cases efficient and undoubtedly save lives.

#### NOTICE TO APPLICANTS FOR FELLOWSHIP IN THE MASSACHUSETTS MEDICAL SOCIETY

The next meeting of the Board of Censors will be held in the various districts on Thursday, May 4.

Under recent changes in the by-laws, applications must be submitted early. The secretary of the district medical society should be consulted immediately for further information.

A S BEGG, *Secretary,*  
*Massachusetts Medical Society*

#### LEGISLATIVE NOTES

##### VOTE ON OSTEOPATHIC BILLS AND ANNUAL REGISTRATION

RETURN TO TUESDAY A. M., MARCH 7

H 985 Two osteopaths on board. Favor, 7, oppose, 1220, blank, 21.

H 986 Osteopath on approving authority. Favor, 31, oppose, 1195, blank, 22.

H 60 Annual registration. Favor, 759, oppose, 468, blank, 20.

Below is listed the progress in the Legislature of some of the bills in which the Massachusetts Medical Society is interested.

#### FAVOR

S 258 Bill relative to the meaning of the terms "rendering medical service," practice of medicine and holding oneself out as a practitioner of medicine and to exempt dentists, optometrists and chiropodists in certain cases from penalties provided for the unlawful practice of medicine. The bill was proposed by the Board of Registration in Medicine. It is favored by the Society with the addition of the following sentence at the end of Section 5A: "Such treatment shall include examination of any secretion, excretion or discharge of the living body."

This bill was heard before the Committee on Public Health on February 9, but no report has yet been made.

H 59 Identical with S 258.

This bill was heard at the same time as S 258, but no report has yet been made.

H 60 Bill requiring annual licensing of qualified physicians. This bill was proposed by the Board of Registration in Medicine, and gives the necessary powers to the Board. The Council of the Massachusetts Medical Society voted to favor it by a vote of 114 to 34.

It was heard by the Committee on Public Health on February 9, but no report has yet been made.

H 61 Bill relative to the qualification for membership on the Board of Registration in Medicine. This bill allows any number of members to be members of one medical society.

The bill has been signed by the Governor.

H 72 Bill providing for the care of certain infants prematurely born. It was proposed by the Department of Public Health, and corrects defects in the previous bill.

It has been passed by the House and referred back to the Committee on Ways and Means. Ways and Means reports it ought to pass with an amendment.

H 73 Bill providing for supplementary reporting of congenital deformities and birth injuries in infants. The bill was proposed by the Department of Public Health and requires that supplementary reports be sent to this department.

This bill was heard before the Committee on Public Health and favorably reported to the house.

H 74 Bill requiring the clerk or registrar in each city or town to give to persons who file notice of intention of marriage suitable information concerning gonorrhea and syphilis. The bill was proposed by the Department of Public Health and it contains no compulsion.

This bill will be heard by the Committee on Public Health, on March 28.

H 75 Bill making various changes in the laws relating to foods and drugs. The bill was proposed by the Department of Public Health in order to bring the state law into line with the new federal act.

It will be heard by the Committee on Public Health, on March 16.

*H 670* Bill providing for the issuance of certificates of approval of bacteriological laboratories by the Department of Public Health. The bill was proposed by the Massachusetts Public Health Association and is similar to the one favored by the Massachusetts Medical Society last year.

It will be heard by the Committee on Public Health, on March 23.

*H 852* Bill requiring licensing of hospitals, convalescent homes and nursing homes. This bill was proposed by the Massachusetts Central Health Council and provides for the Department of Public Health to set up certain standards of health and enforce them.

It was heard by the Committee on Public Health on February 2, but there is to be another hearing later.

*H 1407* Bill prohibiting aliens from practicing medicine. This bill was proposed by Rep. Vaughan and is poorly written. It provides that no license be granted to an alien until his first papers have been filed but allows certain very broad exceptions.

This bill will be heard by the Committee on Public Health, on March 14.

#### OPPOSE

*H 287* Bill providing for a marriage protection law by requiring a physician's examination and certificate before issuance of marriage licenses. This bill was proposed by Rep. Cutler and it needs major revision before being satisfactory.

It will be heard before the Committee on Public Health, on March 28.

*H 551* Bill requiring that notices of intention of marriage shall be accompanied by a physician's certificate that neither party is infected with syphilis. This bill was proposed by Dr. William Frankman and also needs major revision before being satisfactory.

It has been assigned to the Committee on Public Health for a hearing, on March 28.

*H 758* Bill providing authority to the Board of Registration of Nurses to limit further training of nurses of all classes and attendants under certain conditions. The bill was proposed by Miss Josephine E. Thurlow but is against public policy.

It was heard by the Committee on Public Health on February 2 and again on March 7.

*H 759* Bill providing for training and licensing of first class bedside nurses. This bill was proposed by Miss Josephine E. Thurlow, but is against public policy.

It was heard by the Committee on Public Health on February 2 and again on March 7.

*H 858* Bill regulating the practice of nursing. This bill was proposed by the Massachusetts State Nurses Association, and while it is better than last year's bill, some of last year's defects are still present.

It was heard by the Committee on Public Health on February 2 and again on March 7.

*H 985* Bill requiring doctors of medicine and doctors of osteopathy on the Board of Registration in Medicine. This bill was proposed by the Massachusetts Osteopathic Association and would put two osteopathic physicians on the Board.

It was heard before the Committee on Public Health on February 9, but no report has yet been made.

*H 986* Bill providing for a doctor of medicine and a doctor of osteopathy on the Approving Authority, and the

status of approvals by the American Medical Association and the American Osteopathic Association. This bill was proposed by the American Osteopathic Association, it weakens the Approving Authority.

This bill was heard February 9 by the Committee on Public Health, but it has not yet made a report.

*H 1401* Bill providing that certificates of vaccination or non-vaccination shall no longer be required as a prerequisite to the attendance of any child in public schools. This is a typical anti-vaccination bill.

It will be heard before the Committee on Public Health on April 4.

*H 1898* Bill providing for the establishment and administration of a system of health insurance. This bill was proposed by the State Industrial Council of the Congress of Industrial Organization (CIO) and means complete state insurance with a  $4\frac{1}{2}$  per cent pay roll tax. It represents real regimentation of physicians.

It will be heard by the Committee on State Administration on March 15.

#### CHANGE IN COMMITTEE MEMBERSHIP

Dr. Charles A. Robinson, of the Suffolk District Medical Society, has resigned as a member of the Committee on State and National Legislation. His resignation has been accepted by Dr. Frothingham, who appointed on March 1, Dr. Earle M. Chapman, of Suffolk District, as a member of the committee pro tem.

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 13.

#### BARNSTABLE

Sunday, March 19, at 4 00 p m, at the Cape Cod Hospital, Hyannis. Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor C. Guy Lane. Donald E. Higgins, *Chairman*.

#### BERKSHIRE

Thursday, March 16, at 4 30 p m, at the House of Mercy Hospital, Pittsfield. Subject—Anemia. Modern methods in diagnosis and treatment of blood dyscrasias. Instructor Greene FitzHugh. Melvin H. Walker, Jr., *Chairman*.

#### BRISTOL NORTH

Thursday, March 16, at 4 00 p m, at the Morton Hospital, Taunton. Subject—Gonorrhea. Modern treatment of gonorrhea. Instructor George C. Prather. Lester E. Butler, *Chairman*.

#### BRISTOL SOUTH (Fall River Section)

Tuesday, March 14, at 4 00 p m, at the Union Hospital, Fall River. Subject—Bright's Disease and Hypertension. Evaluation of new therapy. Instructor Laurence B. Ellis. Howard P. Sawyer, *Chairman*.

## FRANKLIN

Wednesday, March 15, at 8 00 p m, at the Franklin County Public Hospital, Greenfield Subject—Bleeding in the Third Trimester of Pregnancy Instructor M V Kappius Halbert G Stetson, *Chairman*

## HAMPDEN

Thursday, March 16, at 4 00 p m. at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m, in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke Subject—Syphilis Latent syphilis—diagnosis and treatment Instructor William P Boardman George L. Schadt, *Chairman*

## MIDDLESEX EAST

Tuesday, March 14, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor Rudolph Jacoby Walter H. Flanders, *Chairman*

## MIDDLESEX NORTH

Thursday, March 16, at 4 30 p m, at St. John's Hospital, Lowell Subject—The Toxemias of Pregnancy Instructor Foster S Kellogg William S Lawler, *Chairman*

## MIDDLESEX SOUTH

Tuesday, March 14, at 5 00 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge Subject—Anemia Modern methods in diagnosis and treatment of blood dyscrasias Instructor George R. Minot. Alexander A Levi, *Chairman*

## SUFFOLK

Thursday, March 16, at 4 30 p m, in John Ware Hall, Boston Medical Library, 8 Fenway, Boston Subject—Bright's Disease and Hypertension. Instructor James P O'Hare. Reginald Fitz, *Chairman*

## MISCELLANY

## NOTE

The Henry Asbury Christian Prize, one of the outstanding honors at the Harvard Medical School, has been awarded to Henry Swann, II, of Denver, Colorado, a fourth year student, it was announced today The prize is awarded to the student in the fourth year class who has displayed diligence and notable scholarship and offers promise for the future The award was established in 1937 in honor of Dr Henry A. Christian, Hersey Professor of the Theory and Practice of Physic Mr Swann graduated from Williams College in 1935

In addition, the following awards, totaling \$1700, for the current academic year, were made to thirteen freshmen at the medical school, as follows David William Cheever scholarship to Richard V Riddell, of Elizabeth, New Jersey, Charlotte Greene scholarship to Raymond O Olson, of Providence, Rhode Island, George Haven scholarships to William B Ayers, of Bethlehem, Pennsylvania, Frank A Bautze, of Jamaica Plain, Martin J Bellinger, of Miami, Arizona, John S Chambers, Jr, of Lexington, Kentucky, Burdick G Clarke, of Winnetka, Illinois, Hale H. Cook, of Yonkers, New York, Norman M. Fellows, of Claremont, California, William K. Hall, of Springfield, Missouri, William J Lahey, of East Hartford, Connecticut, Lindley B Reagan, of Poughkeepsie, New York and John Q U Thompson, of Jacksonville, Florida.

## CORRESPONDENCE

## THE NEW BLUE-CROSS CONTRACT

*To the Editor* In the wording of the policy of the Associated Hospital Service Corporation, or Blue Cross, an attempt was made to specify that subscribers who went to a hospital just for diagnosis and not for treatment should not have their bills paid under the terms of the contract For this purpose the term 'periodic health examination' was used in the paragraph which enumerated the service that the contract does not cover Of course, it is a difficult line to draw in trying to separate cases that enter a hospital for diagnosis or for treatment, and in order to clarify this point the directors of the Blue Cross have voted to use the following rule in endeavoring to reach a decision whether the patient enters the hospital just for diagnosis or for treatment

On motion duly seconded it was voted that the Associated Hospital Service Corporation is willing to pay the bills of patients with illnesses or for diagnostic procedure, which, per se, require hospitalization in the opinion of the admitting physician, and furthermore, in interpreting this general policy should be that the admission to a hospital for diagnosis should be done only where the symptoms are those of acute illness

It is not the intention of the Blue Cross to interfere with patient-physician relations or with the physician-hospital relations It is the aim of the directors to have the Blue Cross provide only those services which are considered generally as hospital services Therefore, physicians should not attempt to hospitalize subscriber patients for purely diagnostic x rays which could be performed in a doctor's office If a patient is acutely ill and in the opinion of the attending physician that patient should be admitted to the hospital for diagnostic purposes, then this is a service which the Blue Cross provides Therefore whether or not a patient is hospitalized is entirely up to the physician If, in his opinion, the patient is not acutely ill, and x rays are needed, the patient should be referred to a roentgenologist who has adequate equipment to provide the required services

The new subscriber contract provides for anesthesia administered by a salaried employee of the hospital Only in this way can anesthesia be considered as a hospital service If anesthesia is administered by a non-salaried anesthetist then it becomes a medical service and it is the avoidance of offering medical services which the Blue Cross has attempted in this new contract

Practically every non-profit hospital service plan in the country that provides x ray services offers unlimited service, but the basis of payment is on that of the hospital's average per-diem cost In all cases no specific payments are made for anesthesia, they are included only if administered by a salaried employee of the hospital In order that the Blue Cross may have a better reciprocal understanding with the other plans approved by the American Hospital Association it is our desire to bring our contract in line

Associated Hospital Service Corporation of Massachusetts,  
R. F. CAHALANE, *Executive Director*

21 Milk Street,  
Boston

## NOTICES

## REMOVAL

CARL A. DE SIMONE, M.D., announces the removal of his office to 3 Sparhawk Street, Brighton Telephone STAdium 428

JOSEPH H. SHORTELL, M.D., announces the removal of his office to 478 Commonwealth Avenue, Boston Telephone KENmore 4246

## AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The general oral, clinical and pathological examinations for all candidates, Part 2 examinations will be held as follows: Group A, Saturday and Sunday, May 13 and 14, Group B, Monday and Tuesday, May 15 and 16, immediately prior to the annual meeting of the American Medical Association, at St. Louis, Missouri. Notice of the time and place of these examinations will be forwarded to all candidates well in advance of the examination dates.

Candidates for re-examination in Part 2 (Groups A and B) must request such re-examination by writing the secretary's office before March 15. Candidates who are required to take re-examinations must do so before the expiration of three years from the date of their first examination.

The annual dinner meeting of the board, to which all diplomates and candidates are invited, as well as wives and others interested in the work of the board, will be held on Wednesday evening, May 17, following the close of the examinations.

Application for admission to the Group A, May, board examinations must be on file in the secretary's office not later than March 15. Application blanks and booklets of information may be obtained from Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p. m. on Thursday, March 16, in the amphitheater of the Peter Bent Brigham Hospital, Dr. Robert T. Monroe will give a medical clinic. Practitioners and medical students are cordially invited to attend.

## SIR WILLIAM OSLER HONORARY SOCIETY OF THE TUFTS COLLEGE MEDICAL SCHOOL

The annual lecture of the Sir William Osler Honorary Society of the Tufts College Medical School will be given by Dr. Soma Weiss on Friday evening, March 17, at 8 00, in the Beth Israel Hospital Auditorium, Boston.

Dr. Weiss will speak on 'The Medical Student Before and After Graduation.'

LEONARD M. KLEIN, *Secretary*

## NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The regular meeting of the New England Society of Physical Medicine will be held at Hambury Hall, Ring Sanatorium and Hospital, Arlington Heights, on Wednesday evening, March 15, at 8 00. At 6 45 a buffet supper

will be served to the members and guests in the main dining room of the Sanatorium.

## PROGRAM

Combined Physical Therapy and Motivation in the Treatment of the Psychoses. Dr. Abraham Myerson. Discussion by Drs. Kenneth B. Tillotson and Curtis T. Prout.

All members of the medical profession are cordially invited to attend.

WILLIAM D. McFEE, M.D., *Secretary*

## BOSTON DOCTORS SYMPHONY ORCHESTRA



Rehearsals of the newly organized Boston Doctors Symphony Orchestra, conducted by Nicolas Slonimsky, are held every Thursday evening at 7 30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

## SUFFOLK DISTRICT POSTGRADUATE EXTENSION COURSE

The Suffolk District Medical Society will offer a postgraduate extension course on eight Thursday afternoons at 4 30 o'clock, beginning March 16, 1939. The meetings will be held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. The first talk is as follows:

March 16 Bright's Disease and Hypertension. Instructor, Dr. James P. O'Hare.

Any registered physician is welcome to these sessions; registration is free. You can be on call (telephone, Commonwealth 2800).

REGINALD FITZ, *Chairman*  
LEROY E. PARKINS,  
JOHN F. CORREA, JR.,  
CHARLES MELONI,  
HAROLD L. MUSGRAVE,  
JOHN P. MONKS, *Secretary*  
Postgraduate Committee.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, March 14, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 9 15 p. m.

## PROGRAM

Presentation of cases.

How Does One Study the Cancer Problem? By investigators of the Collis P. Huntington Memorial Hospital.

Medical students and physicians are cordially invited to attend.

ROBERT M. ZOLLINGER, M.D., *Secretary*

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It is not the intention of the Blue Cross to interfere with patient-physician relations or with the physician-hospital relations. It is the aim of the directors to have the Blue Cross provide only those services which are considered generally as hospital services. Therefore, physicians should not attempt to hospitalize subscriber patients for purely diagnostic x-rays which could be performed in a doctor's office. If a patient is acutely ill and in the opinion of the attending physician that patient should be admitted to the hospital for diagnostic purposes, then this is a service which the Blue Cross provides. Therefore, whether or not a patient is hospitalized is entirely up to the physician. If, in his opinion, the patient is not acutely ill, and x-rays are needed, the patient should be referred to a roentgenologist who has adequate equipment to provide the required services.

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Associated Hospital Service Corporation of Massachusetts,  
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Boston

# The New England Journal of Medicine

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VOLUME 220

MARCH 16, 1939

NUMBER 11

## MASSACHUSETTS MEDICAL SOCIETY

### Section of Radiology and Physiotherapy

#### THE X-RAY TREATMENT OF CANCER IN SMALL COMMUNITIES\*

FREDERICK W O'BRIEN, M.D.†

BOSTON

IT IS a truism that surgery, radium and x-ray, alone or in conjunction, may cure some of the varied manifestations of malignant disease commonly grouped under the inclusive term of cancer. At the same time it is recognized that special training, experience and judgment are required in order to utilize these curative agents successfully.

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It is now fairly well agreed that high-voltage

\*Presented at the annual meeting of the Massachusetts Medical Society, Boston, June 1938.

†Professor of Radiology, Tufts College Medical School, visiting roentgenologist, Boston City Hospital.

## SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING  
MONDAY, MARCH 13

## TUESDAY MARCH 14

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Compression of Cancellous Bone. Manifestations in the head and neck of the femur treatment by drill channels Dr Eugene Bozzan
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- \*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital (Shattuck Street entrance)

## WEDNESDAY MARCH 15

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*12 m Clinicopathological conference. Children's Hospital amphitheater
- \*8 p m New England Society of Physical Medicine. Ring Sanatorium and Hospital Arlington Heights
- 8 30 p m Journal-Club meeting of the Boston Lying in Hospital

## THURSDAY MARCH 16

- 8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Peter Bent Brigham Hospital
- \*9 10 a m Joseph H Pratt Diagnostic Hospital Syphilitic Optic Atrophy (with lantern slides) Dr S H Epstein
- \*4 30 p m Suffolk District Postgraduate Extension Course Boston Medical Library
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY MARCH 17

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Treatment of Diseases of the Pericardium Dr C S Burwell
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Clinical meeting of the Children's Medical Service Massachusetts General Hospital Ether Dome.
- 12 m Urological conference, Massachusetts General Hospital lower outpatient amphitheater
- 8 p m Sir William Osler Honorary Society of the Tufts College Medical School Beth Israel Hospital auditorium

## SATURDAY MARCH 18

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY MARCH 19

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Progress in Dental Surgery Dr Kurt H Thoma
- 4 p m Free public lecture Harvard Medical School Amphitheater of Building D Chronic Rheumatism Dr Robert B Osgood

\*Open to the medical profession

MARCH 9 11—New England Hospital Association Page 267 issue of February 9

MARCH 12—Health Lecture Quincy City Hospital Page 363 issue of February 23

MARCH 12—Lecture at the Faulkner Hospital Page 971 issue of December 15

MARCH 12—Free Public Lecture, Harvard Medical School Page 1056 issue of December 29

MARCH 12—Beverly Hospital Public Health Lecture Page 1056 issue of December 29

MARCH 13—Fourth Annual Postgraduate Institute Page 938 issue of December 8

MARCH 14—Harvard Medical Society Page 457

MARCH 15—New England Society of Physical Medicine Page 457

MARCH 15—Boston Lying in Hospital Journal Club meeting Page 404 issue of March 2

MARCH 15 MAY 15 AUGUST 5 and OCTOBER 6—American Board of Ophthalmology Page 126 issue of January 19

MARCH 16—Medical Clinic at the Peter Bent Brigham Hospital Page 457

MARCH 17—Sir William Osler Honorary Society of the Tufts College Medical School Page 457

MARCH 21—South End Medical Club Page 404 issue of March 2

MARCH 27 31—American College of Physicians Page 36 issue of July 7

APRIL 13—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 13 16—American Board of Obstetrics and Gynecology Page 457

MAY 14 20—American Physicians Art Association Page 404 issue of March 2

MAY 15-19—American Medical Association St. Louis, Missouri  
MAY 22 23 and 24—American Association for the Study of Gout Page 405 issue of March 2

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association Page 936, issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association. Page 863 issue of November 24

FALL 1939—Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p m. Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

MARCH 16—Postgraduate Extension Course Page 457

MARCH 29—Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m Program and speakers to be announced.

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced.

## WORCESTER

APRIL 12—Worcester Hahnemann Hospital Supper at 6 30 business and scientific sessions 7 30

MAY 10—Worcester Country Club—annual meeting

## BOOK REVIEW

*Immune Blood Therapy of Tuberculosis with Special Reference to Latent and Masked Tuberculosis* Joseph Hollos 197 pp New York, 1938 \$2.00

The medical world is still looking for a better treatment of pulmonary tuberculosis. The author of the present book thinks he has found it in the use of immune blood. For many years he has tried to convince the doctors abroad and in this country that he is right, but his efforts have not met with success. Since coming to New York City more than twelve years ago his book has been turned down by seven American publishers and is now published by the author himself.

The 'immune blood' is obtained from rabbits which have been infected with a symbiotic culture of human and bovine bacilli. The blood taken from the veins of several immunized rabbits is diluted with 0.5 per cent phenol salt solution containing 0.5 per cent lactic acid. The blood [entirely hemolyzed in this way] is freed from albumin and diluted 1:100,000. This yellowish, clear liquid, slightly acid and protein free, is the original immune-blood. This blood is then further diluted in various strengths and is either rubbed into the skin or given subcutaneously. Dilution X is 1:10,000,000,000 dilution of the original immune-blood.

One could have no quarrel with the trial of such a product under proper conditions, but the 36 cases of tuberculosis which the author presents and in which the material was used for treatment are not at all convincing. The author's case is greatly weakened by the last half of the book in which he takes up neurasthenia, rheumatism, thyrotoxicosis, dementia praecox, epilepsy, dysmenorrhea, disturbances of the digestive system, and other symptom complexes including cholecystitis, appendicitis, leukorrhea, coryza, asthma, neuralgia and psoriasis. He maintains that because these cases improved while he was giving them immune blood therapy all such conditions are in reality instances of masked tuberculosis.



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## MASSACHUSETTS MEDICAL SOCIETY

Section of Radiology and Physiotherapy

### THE X-RAY TREATMENT OF CANCER IN SMALL COMMUNITIES\*

FREDERICK W. O'BRIEN, M.D.†

BOSTON

IT IS a truism that surgery, radium and x-ray, alone or in conjunction, may cure some of the varied manifestations of malignant disease commonly grouped under the inclusive term of cancer. At the same time it is recognized that special training, experience and judgment are required in order to utilize these curative agents successfully.

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x-rays, in the neighborhood of 200,000 volts, are probably adequate in the treatment of cancer amenable to x-ray therapy. The technic for the utilization of such high voltages has been well worked out as to filtration, distance, size of portals, surface and depth doses, time in relation to tissue effects, and end results, so that any trained radiologist can apply them.

If one can kill a third of all cancers of the breast by using 200,000 volts, it has been asked, why not use 1,000,000 volts and kill them all? Unfortunately, this is not a matter of arithmetical progression, there is more in cancer cure by irradiation than the mere magnitude of the potential. One argument often advanced for ultra-high-voltage x-rays is the greater depth dose which can be obtained by their use, but one does not always cure superficial cancer where the depth dose is presumably of little account.

So far as is known, it is absorbed radiation that produces biologic change. The shorter the wave length, the more penetrating is the ray. It is conceivable that radiation could be so penetrating, of such short wave length, that it would not be absorbed appreciably where most needed, this is in a measure what happens under certain conditions when 1,000,000-volt x-rays are used in treating the human body.

Quimby<sup>1</sup> demonstrated long ago, employing 200,000-volt rays and a 0.5 mm copper filter, that increasing the distance from 50 cm to 70 cm increased the relative depth dose even more than would result from a doubling of the voltage. However, if filtration of the order of 5 mm of copper is indicated, this would be uneconomical in certain 200,000-volt setups because of the lengthened duration of treatment. This disadvantage can be overcome by using ultra-high voltage of the medium range (400,000 to 500,000 volts). While the relative depth dose will not be appreciably greater than with 200,000 volts, the total dose that one may give with voltages of this higher range may be greater than can be given with 1,000,000-volt x-rays, since the dose at the surface of exit is not increased in proportion and the use of relatively large cross-fire portals is not thereby limited. Another practical factor to be considered is that with ultra-high-voltage therapy, while one is able to deliver more to the depths of thick parts than with 200,000-volt rays, the normal tissue surrounding the neoplasm receives the same increased dosage.

Indeed, the physicist describes voltages of 500,000 to 1,000,000 as modest voltages. Coolidge<sup>2</sup> recently stated that the range of an impulse generator employing the Marx circuit had been carried to 10,000,000 volts, and that it would apparently be

a perfectly simple engineering and manufacturing undertaking to build one for several times this voltage. Brasch and Lange in Germany have already used the impulse generator, together with a novel type of gas tube, for voltages up to 2,400,000. But there is a vast hinterland between such an engineering accomplishment and its practical application in cancer therapy.

Of greater importance than all theoretical considerations regarding ultra-high voltages is their clinical effect. Any clinic that has had competent experience with ultra-high-voltage x-ray therapy has been most diffident in reporting unfortunate sequelae, and distrustful even of reputed benefits.

Mudd, Emery and Levi,<sup>3</sup> who in 1930 began a clinical study of the effect of ultra high voltage x-rays on inoperable carcinoma, report that irradiated carcinoma of the prostate is a disease which sometimes progresses slowly, so that the palliation achieved with 1,000,000-volt therapy is difficult to evaluate, that results in bladder carcinoma have not been reassuring, that results in rectal carcinoma have been disappointing, that in late stages of cancer of the breast there is little or no additional advantage in supervoltage therapy as against adequate irradiation with 200,000-volt rays, and that in carcinoma of the larynx and pharynx 200,000-volt rays provide sufficient ionization in the tumor-bearing regions involved. In fairness to them it should be said that many of their cases were not only inoperable but hopeless from the beginning. Doubtless with more hopeful cases to treat and surer knowledge of technic their results will improve. This does not mean that there is no place in the cancer institute for ultra-high voltage x-ray generators, but it does mean that there is no justification for considering such generators as any thing more than experimental, and as yet unsuitable for general clinical use.

If this be true, treatment of cancer by x ray in small communities becomes a much more practical matter. With a proper physical setup, a 200,000-volt machine and a trained radiologist, it is not necessary to send patients on a long journey to a metropolitan centre to obtain x ray therapy which can be had and applied intelligently in the home community.

It may be instructive to examine the situation in Massachusetts outside of Metropolitan Boston. High-voltage x-ray equipment suitable for cancer therapy is found in Cambridge, Newton, Salem, Beverly, Lowell, Quincy, Brockton, Fall River, New Bedford, Norfolk, Worcester, Gardner, Springfield, Westfield and Pittsfield, so that no one, with the exception of those living along the tip of the Cape, need travel much more than

twenty-five miles for adequate care. The non-ambulant patient can be cared for comfortably since most of the apparatus is in hospitals.

To be sure, the possession of a high-voltage x-ray machine is not enough. That such a powerful agent for good or ill may be utilized as it should be, is now assured through the operation of the American Board of Radiology, which certifies on examination those qualified to practice x-ray therapy. I am happy to record that everyone in Massachusetts operating high-voltage equipment has been so certified, so that it would appear that the cancer patient in Massachusetts in need of this form of therapy may be treated adequately in our small communities.

Future advance in the x-ray treatment of cancer will probably depend on more certain knowledge of the biologic effects of radiation. Professor Crowther<sup>4</sup> says in a recent review that the first striking feature of any extended survey of the subject is the extraordinary difference shown by different tissues to the action of radiation. Mitosis is inhibited in a tissue culture by a dose of 120 r, but 13,000 r is required to produce even a delayed lethal effect. Apparently living material of any kind can be killed by a massive dose of radiation of the order of 100,000 r and upward. It is not surprising, Crowther adds, that a tissue culture can be killed by a dose of 100,000 r. What is surprising is that profound biologic effects can be produced in the same tissue with something like one thousandth of this dose.

The direct effect produced by the absorption of x-rays is ionization, upon which the biologic effect perhaps wholly depends, however long may be the chain that binds them. Ionization appears to be independent of wave length. The total ionization for equal intensities is probably the same whatever the wave length. Millikan,<sup>5</sup> however, says that the slower a negative electron moves, the more it is susceptible to deflection and the more frequently does it ionize the molecules through which it passes. Webster<sup>6</sup> points out that the short comma tracks produced by x-rays give rise within cells to more ionization per micron than do the longer tracks produced from the primary beam of ultra-high voltage and gamma rays. He says further that most biological experiments appear to show conclusively that if time and space distribution and intensity remain constant, the wave length is of little or no consequence. This is so with skin, lymph nodes, tumor cells, eggs and gene mutations.

Rather too much emphasis, I believe, has been placed on depth dose and lethal dose in cancer radiation therapy, and not enough on the normal physiologic response of the body economy through

which modification of structure is brought about. This is an important link in the chain that connects biologic effect with ionization. There is an axiom in forensic medicine to the effect that there must be a suitable correlation between the weapon employed and the injury received. Until such a suitable correlation between ultra-high-voltage radiation and its effect has been demonstrated, the physician in the small community may feel confident, and may assure his cancer patient, that high-voltage x-rays of about 200,000 volts are adequate for the treatment of cancer, and that ultra-high-voltage x-rays produced by 1,000,000-volt generators continue to remain in the realm of experimental research.

465 Beacon Street.

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4. Crowther J. A.: The biological action of x rays—a theoretical review. *Brit. J. Radiol.* 11 132-155 1935.
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#### DISCUSSION

DR. RICHARD DRESSER, Boston. I have been much interested in Dr. O'Brien's comments on supervoltage radiation, that is on the effect of x rays produced at potentials greater than the usual 200,000 volts. When I began my work in radiation therapy in Boston some fifteen years ago there were only two machines in New England operating at this voltage, one at the Huntington Hospital and one at the Massachusetts General Hospital. This type of radiation was viewed with much skepticism both by radiologists and by the general profession. (It is an excellent scientific attitude to be skeptical of anything new until its worth has been proved.) Today there are more than a dozen 200,000-volt machines in operation in the hospitals of Greater Boston, and as many more have been installed in private offices. Radiologists are attacking the problem of therapy with increasingly greater enthusiasm and increased knowledge, and excellent work is being done, not only in Boston but in many of the small communities.

Today no one doubts the value of 200,000-volt radiation in the treatment of a great variety of malignant conditions. However, x rays produced at lower potentials still have their place in the therapy of many superficial conditions, both malignant and benign. It is my belief that supervoltage radiation is now in the same stage of development that 200,000-volt therapy was fifteen years ago. I am certain that the shorter, more penetrating wave lengths derived from the higher voltages will be found to be more effective in the treatment of certain neoplasms, particularly those which are deep-seated, but that supervoltage radiation will not be used to the complete exclusion of low voltage x rays.

The advantages of supervoltage radiation which we have observed in our experience of a year and a half are as follows. In the first place there is a greater tolerance of the skin to shorter wave lengths. It is therefore unnecessary to produce the severe erythemas which are

so frequently unavoidable with 200,000 volt treatment. Secondly, it is possible to deliver larger amounts of radiation to the deeper portions of the body. This is particularly true when small portals of entry are used. Thirdly, there is less general reaction—so-called roentgen sickness. Fourthly, the amount of radiation delivered below the surface is relatively independent of the size of the portal of entry. It is common practice with 200,000-volt radiation to use large portals of entry in order to increase the depth dose. This means irradiation of much normal tissue, which is unnecessary and even harmful. At higher voltages the portal of entry can be limited to cover only the disease-bearing area, without appreciable effect on the amount of radiation delivered to the tumor. Fifthly, there is possibly a selective action of the shorter wave lengths on neoplastic tissue, but this is still a moot point. Sixthly, it has been our observation that immediate regression of certain deep-seated neoplasms is more probable following supervoltage radiation than it is following 200,000-volt treatment.

The follow up period on the cases which we have treated by supervoltage x ray is too short for us to draw conclusions as to end results.

It should be kept in mind that radiation therapy is not a strictly technical procedure, and that success or failure depends on the training, judgment and ability of the radiologist more than on the apparatus at his disposal.

DR. O BRIEN (closing) I have very little to add, gentlemen. The purpose of my paper was to try to prevent an unreasoned stampede to supervoltage therapy. Lest you think that I have an ax to grind, I may say I have installed and am operating a 400,000-volt machine in my private office. I am as anxious as anyone to have supervoltage x rays utilized in an attempt at the cure of cancer, but I want to do it with an open mind.

The statements which Dr. Dresser made as to greater intensity and depth dose when using 1,000,000 volts nobody disputes from the physical standpoint, but their clinical

application is another matter. Dr. Dresser failed to mention the disadvantages of 1,000,000-volt therapy, and this is the nub of the matter, for they are many. Something more than magnitude of potential is essential in the treating of tumors. While the relative depth dose at 1,000,000 volts is greater than that at 200,000, the total dose that one may deliver to a tumor may under certain conditions be greater with the latter. In thin patients very little is gained by using supervoltage. In heavy ones, if one uses small portals and avoids crossfire and overlapping on the opposite skin, supervoltage can be used to advantage. In crossfire technic the large doses on the surface of exit to which I have referred in my paper limit the practical value of the large depth doses.

As for the reputed greater skin tolerance, opinion is crystallizing that if one uses equal intensities and time spacing the skin reaction is about the same. Regarding less roentgen sickness, we have had less since we started putting our tubes in oil, enclosing the high tension leads and properly ventilating our treatment rooms. I know of no evidence that a 1,000,000-volt irradiation is more kindly to the intestinal mucosa than is one of 200,000 volts.

That the depth dose when using 1,000,000 volts is practically independent of the size of the portal employed is a physical fact of interest. But the fact that back scatter makes up a large part of the depth dose when using 200,000 volts does not constitute a valid argument in favor of one or against the other. If the skin effect is in reality less when supervoltage x rays are used, this may be due to the wave lengths, which are of the order of gamma rays—although biologists working with seedlings and tissue cultures have not demonstrated any specificity.

Million volt x ray therapy is new only to Boston. Supervoltage therapy may prove to be a most potent force in dealing with cancer, but those who have employed it elsewhere for almost a decade are most guarded in evaluating it.

## PHYSICAL THERAPY IN ARTHRITIS\*

FRANK H KRUSEN, MD †

ROCHESTER, MINNESOTA

THERE are three physical measures which may be used in the treatment of arthritis heat, massage, manipulation and splintage, and exercise, postural training and rest. Unfortunately, the use of physical measures in the treatment of arthritis has been to a great extent neglected by the medical profession. There is a pronounced need for the more extensive application of such means in the home.

That there can be no doubt of the value of these methods is attested by leading experts in this field. Fox and Van Breemen<sup>1</sup> have said, "We rely to a great extent on physical medicine." Copeman<sup>2</sup> has said, "One of the most important advances of this century is the discovery that the human body can be influenced as much from the outside by physical methods as from the inside by medicinal methods." Hench<sup>3</sup> has stated that in the treatment of arthritis "physical therapy remains the most potent weapon at hand," and finally, Pemberton and Osgood<sup>4</sup> have asserted, "Any discussion of arthritis which does not at the same time develop, at length, the important field of physical therapy would be a medical incongruity."

## REST

For all patients who have chronic infectious (rheumatoid) arthritis, rest should be prescribed in definite amounts, from a basic minimum of ten hours in bed at night and one hour of rest each morning and afternoon. A few patients may require slightly less than this amount of rest, whereas others may require somewhat more. During the acute stage of the disease rest is of cardinal importance. After this stage has been passed, the patient should be warned against traumatizing the joint by weight bearing and instructed to avoid irritation from repeated aimless movements of the joints involved. He should never wiggle the affected joints. Instead he should carry through the full range of motion in each direction once a day. This attempt should be slow and rhythmic. Sir Robert Jones<sup>5</sup> has said, "No adhesions can occur in twenty four hours which cannot easily be overcome."

The patient who has chronic infectious (rheumatoid) arthritis should avoid general fatigue

rather than remain at absolute rest. He should avoid hurry and worry, and at the same time should take enough non-fatiguing general exercises to improve metabolism and posture. He should also take sufficient local exercise to maintain proper mobilization and alignment of the joints.

## THERMAL AGENTS

Insufficient attention has been paid to the use of certain simple physical measures for systemic heating in the treatment of arthritis. Hot tub baths taken by the patient in his own bath tub may be of considerable value in increasing peripheral circulation and the general metabolism. The temperature of the water may range between 98 and 105°F (36.6 and 40.6°C) and the duration of the treatment may be between ten and forty-five minutes. At the beginning, the lower temperatures and shorter periods of time should be used. Asthenic and emaciated patients should be treated with caution. The full wet pack may also be used to advantage in the treatment of arthritis in the home. Furthermore, with a little ingenuity the physician may have constructed a simple cabinet or steam bath for applying heat to the surface of the entire body.<sup>6</sup>

Local heating of one or more involved joints may best be done with a simple home-made baker or a so-called clamp lamp, which likewise is inexpensive. The baker may be constructed by any tinsmith at the cost of a few dollars. It consists of a framework of strap iron supporting a curved piece of polished sheet tin beneath which four sixty-watt bulbs are placed in double sockets. Specifications for the construction of this apparatus may be obtained by writing to the secretary of the Council on Physical Therapy of the American Medical Association. The clamp lamp consists of a cup shaped "photo-flash" reflector attached by a ball and socket joint to a small rubber clamp, which may be fastened to the back of a chair or the side of a bed. In the reflector is placed a two-hundred and fifty-watt Mazda CX bulb. I have described this lamp in detail elsewhere.<sup>7</sup>

The use of these luminous heaters is to be preferred to the use of the common electric heating pad. The latter often become too hot for proper local treatment, and we have discouraged their use because they are liable to burn the skin. Hench<sup>8</sup> has shown that the average low tem-

From the Mayo Clinic, Rochester, Minnesota.  
Presented at the annual meeting of the Massachusetts Medical Society,  
Boston, June 2, 1933.

†Head of Section on Physical Therapy, the Mayo Clinic.

perature of an electric heating pad is approximately 107.6°F (42°C), the medium temperature 181.4°F (82°C) and the high temperature 244.4°F (118°C). These temperatures are entirely too high for the local treatment of the average arthritic joint.

Physicians are occasionally faced with the problem of prescribing a method of local heating for patients who do not have electricity in their homes. We have experimented with special bakers heated by means of "canned heat", however, these are comparatively expensive to operate and can be applied satisfactorily only to the extremities. Currently, therefore, we recommend the local application of ordinary paraffin.<sup>9</sup> Practically every patient has in his home a kitchen stove and a double boiler, and can obtain from the nearest grocery store several pounds of ordinary paraffin such as is used for sealing preserve jars. The patient is instructed to fill the outer container of the double boiler with water and place the paraffin in the inner container. The paraffin is then heated to the melting point and is allowed to cool until a thin film has formed on the surface. At this time, when the paraffin is at its low melting point, the temperature will be just tolerable to the human skin. The paraffin may then be painted over the involved joint with an ordinary paint brush or a smooth stick of wood wrapped in gauze or linen. About a dozen coats are applied successively and the paraffin is allowed to remain on the area to be treated for thirty minutes or an hour. It should never be applied over a hairy skin without preliminary oiling or shaving. Rarely, a patient's skin is sensitive to paraffin and a slight rash is produced.

On wrists, ankles or knees it is sometimes advisable to use a dressing of paraffin and gauze. The technic is simple. First a layer of paraffin is painted around the joint, next a few turns of gauze are applied to cover the first layer of paraffin. Successive layers of gauze and paraffin are applied until a thick, firm dressing surrounds the joint. Such a dressing will retain its heat for approximately one hour, and the dressing may be left on for twenty-four hours to provide a firm support for the joint. It should then be removed in order that massage and exercise may be administered prior to the application of a similar dressing.

In some cases of atrophic arthritis, applications of cold may be indicated. The so-called "Winteritz bath" has been used extensively in Europe. It consists of immersing the patient in a tub bath the temperature of which is a few degrees below that of the blood, and applying brisk, rapid friction to the surface of the skin during immersion. This seems to have a tonic effect and enables pa-

tients who are susceptible to cold to become tolerant to it gradually.

Frequently, alternate local applications of heat and cold are of benefit. For years specialists in arthritis have used contrast baths, particularly in the treatment of hypertrophic arthritis of the hands and feet. Some recent studies<sup>10</sup> indicate that they should be applied for longer periods than was formerly the custom. It now seems likely that periods of six minutes of heat and four of cold or seven minutes of heat and three of cold are most satisfactory for the average patient with chronic infectious (rheumatoid) or senescent arthritis. The hot water is kept at a temperature of approximately 113°F (45°C) and the cold water at about 45°F (7.2°C), and periods of thirty or forty minutes are devoted to each session.

#### HELIO THERAPY

The use of ultraviolet irradiation is of occasional value in chronic infectious (rheumatoid) arthritis, particularly if there is severe asthenia and secondary anemia. If it is possible to apply direct sunlight to the entire body, Rollier's method of gradual insolation is usually most satisfactory.<sup>11</sup> If an artificial source must be used in the home, the so-called S-1 lamp is as satisfactory as any. At a distance of two feet it produces about the same quality and quantity of ultraviolet radiation as does June sunlight at noontime.

#### MASSAGE

Massage should not be used if there is acute pain on movement of the involved joint or if there is a rise of temperature in the region of the joint. As a rule, in cases of arthritis massage of the joints is avoided, although extremely light effleurage (or stroking) may occasionally be used for reflex relief of pain. As the condition improves, one may gradually increase the intensity of stroking and kneading of the muscles around the joint in an attempt to improve the circulation and tone of the muscle. We have found that it is possible for a skilled technician to instruct a member of the family in a few simple massage strokes which may be used to augment professional treatment.<sup>8</sup>

#### MANIPULATION

Vigorous manipulation applied only when the patient has been anesthetized may be a powerful weapon in the improvement of function in cases of quiescent, traumatic or infectious (rheumatoid) arthritis. Such manipulation is strictly an orthopedic procedure, and requires a great deal of experience for its proper application. Henderson<sup>12</sup> has stated that manipulation of this sort requires more experience than any other orthopedic procedure. It is therefore apparent that such manipulation should always be performed by skilled

hands The joints which respond particularly well to such manipulation are those of the shoulder, hip and knee It should always be remembered, however, that it is useless to straighten a knee unless the hip, ankle and foot of the same extremity are capable of functioning The joints which respond in most cases very poorly to manipulation are the elbow joint, wrist joint and joints of the fingers

It should always be remembered that it is often possible to manipulate arthritic joints gently without anesthesia by means of a procedure which may be termed "active assistive exercise" The patient makes an active effort to move the joint as nearly as possible through its full range of motion and is assisted by the operator in carrying the movement a little beyond this range Applied slowly and skillfully once or twice a day just after the part has been heated and massaged, such a procedure frequently produces a gradual but great increase in range of motion This active assistive exercise should always be attempted for at least three weeks before more severe measures under anesthesia are attempted At no time should the operator jerk or pull the joint violently He should apply pressure slowly, gradually and just short of producing severe pain If there is still increased pain in the joint twenty-four hours later, it will be known that the measure was performed too severely, and that it should be discontinued for one or two days and then applied less strenuously than before This same program of active assistive movement should always be started within twenty-four hours after a severe manipulation under anesthesia, in order that the mobility of the joint may be maintained It is far better to give a strong sedative or narcotic and to exercise the joint early than it is to allow it to remain at rest until adhesions have formed

It has been shown recently<sup>13 14</sup> that traction and rotation of the cervical portion of the spine may relieve radiculitis secondary to hypertrophic arthritis of the cervical spine and involving the shoulder girdle, arm or precordium This type of segmental neuritis is probably much more frequent than is generally recognized, and the application of heat, massage and traction by means of the Sayre head sling, with mild, forced rotation of the neck during traction, often seems to give considerable relief

#### SPLINTS

In considering every case of chronic infectious (rheumatoid) arthritis, the physician should remember that, above all, every effort should be made to prevent deformities Once deformities develop, it may take years to correct them The

chief deformities likely to arise in this type of arthritis are adduction of the shoulders, thoracic kyphosis with fixation, flexion of the elbows, wrists or knees, loss of abduction of the hips and foot drop The proper application of splints will prevent such deformities

The patient must always use a bed which does not sag At least twice a day he should discard all pillows and fully extend all his joints for a half hour Once deformities have developed, wedged casts or traction may be required to overcome contractures It is particularly important to remember that such patients should avoid the constant use of pillows under the knees, because this is one of the most frequent causes of flexion contractures of the knees

#### SHOES AND SUPPORTS

The physician should never permit the patient to wear shapeless bedroom slippers continually Patients are frequently of the erroneous belief that such slippers are more comfortable than are shoes As a matter of fact, they merely exaggerate deformities and are not nearly so comfortable as well-fitting orthopedic shoes equipped with a metatarsal bar on the sole just posterior to the transverse arch of the foot, heel pads or wedges, and a soft felt pad to support the longitudinal arch of the foot Rigid metal arch supports are not to be favored, for they are not well tolerated by the patient who has arthritis, and they tend to produce pressure atrophy of the plantar muscles<sup>15</sup> Elastic supports for the knee or ankle or properly applied ace bandages are frequently of value when applied to the knee or ankle, but are rarely of use for other joints Sacroiliac belts occasionally afford considerable comfort

#### EXERCISE

Exercise is always necessary in the treatment of chronic infectious (rheumatoid) arthritis In Nature's warning, in the form of severe pain and acute cases in which motion is started prematurely, spasm, will usually prevent continuation of such motion As soon as the patient starts wary voluntary motion, this is the signal for the inauguration of gentle passive motion by the operator Exercises should be graduated slowly from passive motion to active assistive motion and, finally, to fully active motion Knees should be exercised at first with the patient in the prone position in order to avoid the strain of weight bearing The knees should always be straightened as much as possible before walking is attempted Exercises should be slow and rhythmic and through the fullest range of motion that is painless One should always avoid jerking, wiggling and pump-

perature of an electric heating pad is approximately 107.6°F (42°C), the medium temperature 181.4°F (82°C) and the high temperature 244.4°F (118°C). These temperatures are entirely too high for the local treatment of the average arthritic joint.

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more attention to this condition and to the use of firm massage in its treatment<sup>19</sup>

### FEVER THERAPY

The results of treatment of chronic infectious (rheumatoid) arthritis with prolonged fever therapy at the Mayo Clinic have not been particularly encouraging. Approximately 10 per cent of patients showed much improvement, and 20 per cent moderate improvement, the remaining 70 per cent showed little or no improvement<sup>20</sup>. On the other hand, daily fever therapy of short duration (thirty minutes), administered either in a tub or a fever cabinet, may be a valuable adjunct in routine physical treatment. In practically all cases, such short periods of fever therapy are followed by massage and exercise of the involved joints.

In cases of gonorrheal arthritis, prolonged fever therapy is of the utmost value, although, since the advent of sulfanilamide, fever therapy is not so frequently indicated as formerly. Our recent studies<sup>21</sup> indicated, however, that about 10 per cent of the patients who had gonorrhea failed to respond to sulfanilamide alone. In these cases we now recommend combined sulfanilamide and fever therapy. In 25 cases of gonorrhea in which a response to sulfanilamide failed to occur, a prompt response was obtained by this combination.

### CONCLUSIONS

Physical measures are of very great value in the management of both chronic infectious (rheumatoid) and hypertrophic arthritis. Many of these may be used to great advantage in the home. It would be of particular advantage for the general practitioner to apply such procedures extensively.

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### DISCUSSION

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The next step will probably be to set up some form of home treatment for the arthritic patient. This is very vital, because there are too many arthritic cases in Massachusetts for all to be housed in institutions. There is not money enough to build more institutions, and we have not enough personnel to carry them on if the money were available. We certainly have not enough educated personnel to manage more than one or two, so it seems unwise to advocate large institutions for the handling of arthritic patients. The treatment should therefore be carried on at home. Furthermore, the patient is a little happier there. We do need a place where the patient can go through a sort of clearing station for study and care of all the aspects of his joint condition. The family and the family physician should be brought into the picture because they will be responsible for the care of the patient.

The care of the arthritic patient comes under three heads. First, medical: there is no point in taking care of an arthritic joint until one finds out what is the matter with the patient. Secondly, orthopedic: treatment the orthopedic surgeon has come to acquire a special knowledge of joints and of the manipulation of painful ones, necessary because so many can be injured by poor massage. Deep massage and passive manipulations, by ignorant persons, have ruined many a good joint that might otherwise have been saved. Finally, there is the application of physical therapy measures which have been pre-

handle movements. One slow daily movement through the fullest, possible range of motion is preferable to many minor ones through a partial range of motion.

#### POSTURAL EXERCISES

Properly applied postural exercises rebalance the body as a whole so that there is better alignment of the joints and avoidance of strain. It has also been suggested<sup>16</sup> that postural exercises tend to promote normal visceral function. It has been pointed out<sup>17</sup> that hypertrophic arthritis always involves the points of greatest chronic strain in the spine, neck, fingers, knees and hips. With the exception of the fingers, all these joints are involved in bearing weight, and it seems logical to assume that postural exercises tend to lessen the strain on these joints by improving alignment. The patient who has arthritis and faulty posture should always be taught the following five cardinal exercises: walking with the feet pointed straight ahead and with the weight evenly distributed, rolling the hips under (contracting the gluteal muscles downward and the abdominal muscles upward, thus rotating the pelvis into a more level position), raising the chest, lifting the back part of the head toward the ceiling (thus straightening the dorsal and cervical spine), and walking, standing and sitting as erectly as possible.

Special attention should be directed toward exercises for the feet. Routine exercises for correction of pronated feet may often be in order.

#### EXERCISES UNDER WATER

Exercises performed under water may be of much value in the treatment of extensive chronic infectious (rheumatoid) arthritis. Some of these exercises may be done in the patient's own bath tub, or occasionally a Hubbard tank may be constructed\*. The temperature of the water should vary between 98 and 105°F (36.6 and 40.6°C), and massage and exercises may be given under water during the period of maximal hyperthermia. If the palms of the operator are slightly oiled, he can massage under water without difficulty. It is possible by means of such baths to produce mild febrile reactions not unlike those produced by administration of typhoid vaccine. The bodily temperature may readily be raised within thirty minutes to 101°F (38.3°C). Movements can be carried through a greater arc with less pain under water, and because of the buoyancy of water, weak muscles are capable of a greater amount of work. Most observers agree that for a patient

who has advanced infectious (rheumatoid) arthritis, the best way to start walking is in a pool.

#### OCCUPATIONAL THERAPY

Occupational therapy is extremely important in the rehabilitation of the patient with arthritis. For the knee, hip or ankle one may use a velopedic jigsaw or a stationary bicycle. For the ankle, one may utilize a foot pedal scroll saw or an ordinary sewing machine. For exercising stiff fingers and wrists, modeling with clay or hammering and planing is of value. For the shoulder, elbow and upper part of the back suitable exercises may be provided by having the patient do basket making or loom-weaving, with the materials placed high enough to cause him to increase the upward range of shoulder motion as he works. A skilled occupational therapist can teach the patient many curative occupational procedures, most of which may be carried out at home.

#### HYDROTHERAPY

As previously mentioned, hot baths may raise the temperature of the patient above 101°F (38.3°C), and it has been shown by Currence<sup>18</sup> that they also increase the number of leukocytes, the circulation in the capillaries of the nail beds and the metabolic rate. The whirlpool bath may frequently be used to advantage in the treatment of arthritis involving the joints of the extremities. The part to be treated is placed in a bath of whirling aerated water at a temperature of 110°F (43.3°C), usually for thirty to forty-five minutes. Such a bath produces great dilatation of the peripheral capillaries, a soothing effect on the peripheral nerve endings and relaxation of the muscles. A simple whirlpool bath can be constructed for a few dollars†.

#### FIBROSITIS

This condition, which is described at great length in the Continental literature, is often unrecognized in this country. It consists of chronic inflammation of white fibrous tissue, and is particularly characterized by the formation of small palpable nodules in the subcutaneous tissue or muscles. It is of special interest to the physical therapist, because it has been claimed repeatedly that a certain type of very firm massage is of great value in treatment. It has been stated repeatedly by British authors that very firm local massage will "break up" many of the nodules, with subsequent relief from pain and muscle spasm. It would seem that American physicians should pay

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scribed by the doctor and the orthopedic surgeon at the proper time.

As to heat, it is important for the arthritic patient to keep warm if he is a bed patient. If he gets chilled at night he is sure to have an uncomfortable day. There are occasional patients who cannot stand heat in any form, and it should not be forced upon them. I have a patient who keeps her room temperature at 60 degrees all the time. If it rises to 65 or 68 degrees she is always uncomfortable. Heat may be overdone in the care of arthritis in general. In reference to massage, it is impossible to massage arthritis out of joints, and I do not believe that we can massage fibrous masses out of muscles, especially out of tendons, where they are prone to occur.

Rest, of course, which Dr Krusen spoke of at the end, is one of the most important factors in the management of this disease. Rest of the patient, if ill, and rest of the joint—two considerations for rest. One needs to know whether the joint is the so-called hypertrophic or degenerative type, or the so-called atrophic or proliferative type. The first type will not ankylose. It will lose motion if enough bone is formed by overexercise to irritate the joint. In the proliferative type, which is prone to ankylosis, we must have movement. The movement should not be through the whole range of the normal joint motion, but within the range of discomfort. Thomas splints should be used with the patient in bed, with an overhead arrangement of pulleys, splints jointed at the knees and ankles, elbows and shoulders, so that they can be run by the patient. They can be built at home with little difficulty with a frame over the bed, a gaspipe apparatus or some posts hung on the corners of the bed.

When patients go through these motions, they should be taught how to use their muscles actively. Passive motion alone will irritate a joint, because passive motion tears the delicate joint membrane, and every time the joint membrane is torn pain and muscle spasm occur—an effort on the part of nature to splint the joint. Small hemorrhages take place in the joint, and there is an increase in the ankylosing type of tissue. The early motion should be active plus passive. A patient who has an acute arthritic joint—a knee, for instance—cannot stand very much motion. The first thing we have to combat is pain, which we can do with medication of some sort, plus a splint. The patient is then taught how to contract rhythmically the muscles that control the joint. That is, the first effort to improve the physiology of a knee joint is to teach the patient how to tighten and relax his quadriceps muscle. The quadriceps muscle in an inflamed knee is always atrophied. It is impossible for this patient to walk on an inflamed knee which has not muscle power enough to support the body weight on his leg when he is erect. The exercise should be done every hour by short rhythmic contractions and relaxations, not hard enough to produce pain. These exercises improve the tone of the skin, the circulation and the muscles and combat bone atrophy. When we combat bone atrophy we are on the road to combating atrophy of the cartilage, which is one of the factors in the production of ankylosis of these arthritic joints. As soon as these patients have enough muscle to hold the knees straight against gravity we can begin active exercises.

It is a bad practice to splint a joint indefinitely. If there is an ankylosing type of arthritis of the knee, and the knee is kept in a plaster cast, bone atrophy increases and as a result the joint collapses. Ankylosis then occurs. The splints must be removed once or twice a day for exercise in order to stimulate the joint function. The mere setting of the muscle will do so.

It is unfortunate that many ready made shoes do not fit properly. There are over four hundred million pairs of shoes produced in the United States every year, and they do not fit anybody accurately. We might as well go out and buy window glass for spectacles as to buy shoes the way we do. It is for this reason that a shoe has to be rebuilt by the surgeon. If we have a pronated foot that is kept pronated by spasm of the peroneal muscles, we cannot apply the sort of shoe that Dr Krusen advocates because it works against the spasm of the muscle. One has to apply a shoe that allows the foot to be pronated until the spasm has gone from the muscles or until manipulation has relieved the tension of the muscle.

No force should ever be used on an ankylosed type of arthritic joint, because it will do nothing but irritate the joint.

One of the symptoms of arthritis of the neck is pain at the root of the neck. In addition, there may be pain going down the arm along one or more or all the nerves of the brachial plexus. The Sayre head sling, which most orthopedic surgeons have used for years, is a very simple apparatus for use in this contraction. A good brace shop will make up a leather sling for very little money. One needs a double and a single block of the awning type, awning line and an awning screw and the header of a closet doorway. The patient sits in a chair and is instructed to pull on the rope and stretch his neck very slowly and very gradually. He should not pull more than eight or ten times twice a day. Some of these patients are inclined to pull themselves off the chair and wonder why they have so much pain in their necks.

Often associated with this type of arthritis we have chronic headache and sometimes chronic sore throat. Chronic headache at the base of the skull is caused by spasm of the trapezius muscle. It is sometimes referred all the way over the skull to the eyebrow. In a great many cases where no other cause for the headache can be found, it may be discovered that severe arthritis of the cervical spine is the producing factor. The use of the Sayre sling is of great help in these cases.

When these patients are able to stand they usually have a bad posture because they have been ill for a long time. They must have corrective exercises for their postural difficulties.

The Marie Strumpell type of arthritis, that is, the ankylosing type, which usually affects the spine oftener in men than women (about 9 men to 1 woman), is a very disabling condition. These patients usually go around bent over at the waist. Once in a while one sees a patient walking about the streets of Boston with his hands almost on the sidewalk. Whenever it is suspected that a patient has arthritis of the spine, the chest should be measured, since one of the early symptoms in this type of arthritis is diminution of the respiratory excursion. It may be as little as a quarter of an inch. These patients must have deep breathing exercises, preferably lying on the floor, on a hard surface. They need something to increase the chest expansion, this helps a little bit in diminishing their deformity. Occasionally patients with chronic arthritis get flexion contracture of the hip, the muscles becoming shortened. One patient I saw not long ago, a man about six feet tall, had developed a 35-degree flexion contracture of the hips, being a very intelligent man but very much depressed, he said. My one difficulty is that I cannot look my fellow man in the face. If I could be sure that I could look him straight in the eye once in a while, I should feel much better from the psychological point of view. His flexion deformity was relieved by dividing his contracted

hip fasciae. Getting rid of 35 degrees of hip flexion contraction allowed him to stand up straight and he began to improve in his general condition within three or four weeks.

We have found underwater exercises in the early stages of arthritis in children very valuable. These children are taught to do their exercises under water.

A good many patients claim that after a good night's sleep they do not feel so well the next morning. They conclude from this that they are much worse. Now, patients who are uncomfortable through the night are usually better in the morning because they have had physical therapy throughout the night. In other words, every time they have turned over in bed they have been awakened and have had to move their joints in various positions. Thus, a patient who is awake at intervals during the night is usually better in the day. In other words, their joints do not get a chance to stiffen up as they do when they sleep a long time in one position.

Sometimes one may think that a patient's joints are worse. The patient may complain that he feels very much more uncomfortable than he did a month before. He thinks he has had a new attack or an increase in the arthritis. If there is a sudden disappearance of fluid and the membranes in that joint come together, the two surfaces rub against each other and the patient has more pain. This does not mean that he is worse. These patients usually take two or three days to recover under rest and then go on again for a month or two. The swelling of the joint membrane gradually decreases, and then there is another attack of pain. One finds that there is a little less thickening and a little smaller joint, but there is a little more rubbing and grating than before. It does not mean that there is a recurrence or increase in the arthritis.

Another word about heat. Heat never cured arthritis. Dr. Krusen knows as well as I do that there is a great effort being made in this country to sell every doctor a short wave diathermy machine. The propaganda for heat therapy and short wave diathermy machines is going on at a great pace. I do not know how many different machines there are—probably over a hundred. You can buy them from \$145 to \$4500. It looks to me as if everybody would have a short wave diathermy machine to treat all sorts of diseases. One cannot treat arthritis with heat alone. There must be a variety of treatment—a finding out of what is the matter with the patient and getting rid of it by the medical man, splinting and care of joints by an orthopedic surgeon, and the use of heat, massage and exercise by the physical therapist.

DR. GEORGE R. MINOT, Boston. Dr. Krusen has given us an excellent exposition of a most important form of treatment to be used in arthritis.

In the treatment of this disease, there are certain principles to keep in mind to improve all functions of the body and to modify or to remove any basic causes. The difficulty very often is that we do not know what the basic causes are. We must make adjustments to lessen the burden of the handicapped organism. It is important to know intimately one's patient. Time must be spent obtaining a detailed history and becoming sufficiently acquainted with the individual to understand his reaction to his fellow men, to his home, his environment, his country, to all those problems of life often spoken of as social aspects of medical cases. If one thoroughly understands the patient as a human being, one will be able to aid him.

As has been mentioned by Dr. Krusen and Dr. Ober, rest is undoubtedly of the utmost importance in treatment. Physical therapy is going to help us gain that rest. You

remember Dr. Krusen explained that following the use of packs the individual is relaxed and goes to sleep. Anything we can do to gain rest, physical or mental, is going to be of advantage to the patient. Rest means more than going to bed. One who has gone to bed may become very restless, have tense muscles, be worried, be overactive mentally, be unduly anxious. Merely saying that he should take a rest or go to bed for an hour will accomplish nothing. Each patient presents a separate problem. A precise program of rest, adjusted to the given case, can be prescribed intelligently only after one thoroughly understands the patient, including his reactions to other individuals and his environment. The goal is to obtain habitual relaxation and tranquility.

An acquaintance with Jacobson's studies on progressive relaxation can be serviceable in aiding these patients. Relaxation does not mean simply diversion. Indeed, rest may mean extraordinarily different things to different people. I recall a woman with rheumatoid arthritis who was advised to rest for an hour in the morning, an hour in the afternoon, with clothes off, in bed. She became progressively worse. At the end of about two months it was realized that those in charge of her case did not know exactly what she did when she rested. On inspection of the home and finding out the exact circumstances of her rest, it was learned that they consisted of lying on the bed with the telephone beside her, which she answered whenever it rang and sent messages. Furthermore, she kept pencil and paper in hand and constantly made notes regarding many sorts of matters to be attended to. She was lying down, that meant rest to her.

A policeman was advised to rest, nothing more was said to him about this matter. Rest to him meant diversion. He thus took his family in his automobile from Boston to the Pacific Coast in about twelve days.

One must prescribe rest. To some individuals that may mean diversion, to others to become a complete sloth. Just as rest may mean different things to different people, we must realize that the word fatigue, as L. J. Henderson has pointed out, can be applied to many different conditions. The word fatigue is used, for example, for feelings arising from utterly different physiologic processes, for example from lack of oxygen, from low blood sugar, from that condition associated with high atmospheric pressure, high humidity and heat. There are other disorders that can lead to a condition that individuals describe by the word fatigue, for example dissatisfaction caused by emotional tension.

The exact type of rest to be prescribed for fatigue varies according to the nature of the case. In all cases, however, it is relief from strain that has to be secured, and it is often a difficult duty and a difficult thing to do, because it means very often adjusting a person to what appears to be antagonistic tendencies. Even so, if every patient with rheumatoid arthritis could at the beginning follow out a program of rest somewhat comparable to what you would advise for an early case of tuberculosis, there would probably be a good deal less of advanced arthritis. One must, however, utilize many measures to adjust the individual to all his altered physiologic conditions.

Exercise has been mentioned, it is important, and must be carried out as Dr. Krusen and Dr. Ober have indicated. Those who do best are those who persevere and follow out directions given by a physician who has optimism and who knows how to aid these patients psychologically as well as physically.

I am not going to discuss other methods of treating the various forms of chronic arthritis, but I will mention diet. There is no specific diet for arthritis. You must consider

the patient as a whole. Is he overweight, underweight? Is he by any chance allergic to any food? What is the state of his gastrointestinal tract? The problem very often becomes one of considering the whole individual's nutritional state combined with the condition of his intestinal tract, without there being any particular or specific diet. Besides a diet suitable for optimal nutrition, it is perhaps wise in certain cases to give an excess of those substances the action of which may be impaired in the face of infection, such as some vitamins and minerals.

Our aim must be to restore normal physiologic processes. Physical therapy is certainly one measure. There are others which demand attention to the patient as a whole, his mental as well as his physical status should not be neglected. Much can be accomplished by caring not only for the disease but also for the individual himself.

DR. KRUSEN (closing) I am extremely grateful to Dr. Minot and to Dr. Ober for adding to my remarks. These brilliant discussions have indicated that this subject is very complicated, and a number of important points which I was unable to cover in my presentation have been mentioned.

With regard to the institutional treatment of arthritic patients, it should be stressed that from the physical therapeutic standpoint great progress will not be made until each hospital possesses an organized department of physical therapy conducted under medical supervision. It is not the custom in modern hospitals to permit the clinical laboratory to be managed by a group of lay technicians without medical supervision. One would never think of allowing a department of roentgenology in a hospital to be under the complete supervision of a group of technicians without a medical director. Similarly, lay technicians should not be permitted to conduct a department of physical therapy without direct medical supervision. It is impossible for a lay individual to make the essential contacts with referring physicians concerning diagnosis and treatment. If physical therapy is to develop properly, there must be competent medical supervision of the departments of physical therapy in hospitals throughout the United States.

Physical therapy is a specialized field of knowledge. Despite the fact that there has been a tendency among some medical groups to consider that physical therapy is not a separate specialty and that it should be used by practicing physicians only as needed in their own particular fields, there are physicians specializing in this field of medical treatment. It is true that practically all physicians should make some use of physical therapy, leaving the more complicated procedures to the elaborately equipped departments of physical therapy in hospitals.

Although a physician may perform simple laboratory tests in his own office, he avoids doing Wassermann tests or complicated examinations of the blood in his office. A physician may utilize a small portable x-ray apparatus in his own office, but he depends, if he is wise, on the department of roentgenology in the hospital for more elaborate roentgenologic diagnosis and treatment. Thus, although a physician may use certain simple devices for physical therapy in his own office, he should rely on the specialist in that field for more elaborate methods of treatment. There can be no question that at the present time physical therapy is a specialty, and that there are many good physicians specializing in this field.

At the Mayo Clinic last year, approximately one twelfth of all the patients were referred to the Section on Physical

As Dr. Ober has pointed out, there are some patients who are more comfortable without heat. One might go even farther and point out that in certain cases patients may be benefited by applications of cold. The so-called hardening treatment (*Abhärtung*) for the patient who has arthritis may be used to relieve his abnormal sensitivity to external cold.

Dr. Ober mentioned active and passive exercise. I prefer to use the phrase 'active assistive exercise' because the patient makes an active effort to move the part and is assisted by the physician or technician in further movement. I do not agree that these movements should always be painless. If pain does not last for more than two hours after manipulation and if a flareup does not occur on the following day, as a rule the manipulation has not been too great.

Quadriceps-setting exercises are important, as stressed by Dr. Ober. The physician would do well to learn to perform this muscle setting exercise himself. It is then easier for him to show the patient how to perform it.

I have purposely avoided too much discussion of diathermy. I have reviewed this subject recently in an article which appeared in the *Journal of the American Medical Association*. Short wave diathermy, in my opinion, does not produce specific biologic or physiologic effects other than those attributable to heat. However, one may produce deeper heating with short-wave diathermy than with any other method of heating tissues, and from this standpoint it is of value. Occasionally there are cases of arthritis in which short wave diathermy may be of value, but they are few. It has been claimed that one can destroy the gonococcus *in vivo* by means of local applications of short wave diathermy. This is probably not true.

As far as can be determined, short wave diathermy is not capable of producing any great selective heating effects in the living human body, because the very efficient circulation rapidly equalizes the heat in the various tissues.

One final point which was mentioned by both Dr. Ober and Dr. Minot, and which I desire to stress, is the problem of rest. I feel that this problem is very important. In the clinic where many cases of acute arthritis are encountered, one is likely to overstress the value of rest, whereas, as Dr. Hench has pointed out, in the clinic where many chronic cases are seen, there is a likelihood that the value of exercise will be overemphasized.

At Rochester we probably see an excess of chronic cases, and therefore we may stress exercise unduly. The problem is not so much one of exercise as of mobilization. The patient should be physically rested and at the same time should have the joints mobilized. For example, the patient who has static senescent arthritis of the knee should avoid bearing weight, but the knee should be kept mobilized by means of active assistive exercises. The patient who had advanced, chronic infectious (atrophic) arthritis may awake after ten hours of sleep more fatigued than when he went to bed. This seems to indicate that rest alone is not the solution of the problem.

I am very glad that Dr. Minot mentioned relaxation and the work of Dr. Jacobson, because it would seem that routine training and relaxation should benefit certain types of patients who have arthritis. Occasionally, an intelligent patient may be told to obtain Jacobson's book for the lay man entitled *You Must Relax*.

In conclusion, I believe that this discussion has indicated definitely that the management of each patient who has arthritis is an individual problem, and usually a most complicated one. The entire subject of the use of physical agents in the treatment of arthritis deserves much more attention than it has received in the past.

## RADIATION THERAPY IN THE TREATMENT OF INFLAMMATORY LESIONS\*

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**R**OENTGEN-RAY therapy in the treatment of inflammatory lesions has been used to some extent since the early days of x-ray, but only during more recent years has a large enough experience been gained for such therapy to command the attention that it deserves. In 1916 Dunham<sup>3</sup> published an article on the treatment of carbuncles with roentgen ray. Since that time there have been a steadily increasing number of reports of satisfactory results in treating inflammatory processes.

Acceptance of this method of treatment has probably been delayed by fear on the part of clinicians that it would result in those reactions sometimes associated with the irradiation of new growths. It should be understood that the treatment of inflammatory processes constitutes an entirely different field from that of malignant neoplasms. In the latter the aim is to give the maximum dose of radiation without irreparable damage to the underlying and surrounding structures, while in the former a very small dose is sufficient. In fact, the optimal amount of radiation is so small that it usually produces no skin changes and no appreciable untoward systemic effect. It may be stated without qualification that x-ray treatment of inflammatory lesions with proper dosage is harmless. Fortunately there is also considerable latitude to the permissible amounts and quality of radiation. The lower limit is indefinite, as there have been reports of beneficial results in mastoiditis following the routine radiographic study of the mastoids.<sup>14</sup> There is also a wide variation in the voltages which can be used—from 50,000 to 200,000 volts. Experience has proved that the upper limit of dosage should not ordinarily exceed one half an erythema unit.

Radiation therapy was at first empirical, and many diseases were treated that did not respond favorably. There was no adequate explanation of the favorable responses in certain diseases. Today it is known that lymphoid cells are the most sensitive to roentgen ray of all the cells in the body. These include the lymphocytes in the spleen, lymph nodes, circulating blood, tonsils and other structures. Such cells are destroyed by relatively

small doses of radiation. Next to the lymphocytes in sensitivity to irradiation are the polymorphonuclear leukocytes and the eosinophils. Warthin<sup>18</sup> found a rapid, almost explosive, destruction of lymphocytes within fifteen minutes after irradiation. At first thought one would not consider the destruction of lymphocytes and polymorphonuclear leukocytes to be a good therapeutic measure, as they are the productive agencies in combating disease, but in accordance with the theory of Fried,<sup>5</sup> it has been found that the destruction of leukocytes by irradiation within advisable limits apparently liberates antibodies, ferments or some bactericidal agent which brings about the prompt subsidence of the inflammation. What this substance is and how it increases phagocytosis has never been demonstrated, and the clinical results must be taken as proof of the efficacy of such treatment. That the beneficial effect is not due to direct action of the x-ray on the bacteria seems to be well proved by numerous experiments in which bacterial cultures were irradiated in vitro without destructive effects. Mohler and Taylor's experiments<sup>10</sup> show that it is very improbable that a bacterium would receive a lethal dose from the usual irradiation used in the treatment of inflammatory diseases. Desjardins<sup>1</sup> suggests that variation in effectiveness in different cases may be due to variation in the degree of the leukocytic infiltration of the offending lesion. A survey of some of the disease processes which have been cured or benefited by x-ray therapy shows that the same principle applies throughout, that is, if there is leukocytic infiltration with a high percentage of lymphocytes, irradiation alone or in conjunction with the usual therapeutic agencies such as heat or serum usually brings about a rapid termination of the disease process. In general, the more marked the inflammatory process and the earlier it is treated, the better the results.

Let us now examine the methods and results of x-ray therapy in a few of the inflammatory conditions in which it has been used in enough cases to demonstrate its value.

### PUERPERAL MASTITIS

Pfalz<sup>12</sup> in 1934 reported his experimental and clinical results in puerperal mastitis. This work

From the radiological laboratories of Drs. Cover, Christie and Merritt. Presented at the annual meeting of the Massachusetts Medical Society, Boston, June, 1933.

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is typical of the methods used and the results obtained in the treatment of inflammation. He produced mastitis in guinea pigs by intramammary injection of *Staphylococcus aureus*. The lesions were then treated with 320 r of roentgen ray. It was found that, on the average, irradiation shortened the course of the disease and usually prevented breaking down of the tissues. Wright's opsonic and leukocytic indices were used in determining the changes in blood immunity produced by x-ray. In early infections these indices were raised after irradiation, in advanced suppuration they increased or remained constant. With this experience as a basis for treatment, Pfalz treated 41 cases of human mastitis with small doses (50 to 60 r) of x-rays. The series included both early and late cases. This method of treatment proved distinctly superior to other forms. There were no ill effects and no disturbance of lactation. We have treated a small number of cases of postpartum mastitis, and have had uniformly good results. In the cases which were referred in the early stages of the disease, there was prompt subsidence without suppuration. Unfortunately, most of the cases were referred late, the usual treatment with ice pack had already been used and the inflammation had continued to spread. Following x-ray therapy the pain increased for about six hours and then usually subsided, the process became localized, and either there was spontaneous rupture of the abscess or surgical intervention was resorted to, with drainage of the localized abscess. In all cases the referring obstetricians believed that the x-ray therapy shortened the course of the disease and localized the process. The dose given was 160 r at 112,000 volts, filtered through 3 mm of aluminum. This was repeated if necessary in three days. In no case did the treatment interfere with subsequent lactation.

#### ACUTE MASTITIS

Among 500 cases of inflammatory lesions treated there were 32 of acute mastitis. Five of these were in male adolescents. The breast and often the axillary glands were painful. Trauma was of etiologic importance in some cases. Usually there was no known predisposing factor. In none of the cases was there any suggestion of malignancy. The results of treatment were excellent, and the inflammation subsided after one to four treatments, without suppuration. A dose of 160 r was given the first day, followed by 100 r on alternate days until four treatments had been given.

#### FURUNCLES AND CARBUNCLES

X-ray therapy is especially successful in the treatment of furuncles.<sup>3,6</sup> If the case is seen

early, before the induration is great, resolution without suppuration may be obtained in a large percentage of cases. It is also beneficial in the later stages in bringing about softening and localizations as well as prompt healing of the incision if one is necessary. The most striking effect in both furuncles and carbuncles was the quick relief from pain, nearly always within twenty-four hours and usually in six to eight. Excellent results were obtained in recurring crops of furuncles, in the absence of such underlying diseases as diabetes.

Radiation therapy is of the greatest use in furunculosis of the upper lip, nose and face. When the infection is of sufficient virulence, there is marked lymphangitis and thrombophlebitis. Infection from facial lesions not infrequently spreads early to the vessels of the brain, with a fatal termination. In our series of 27 cases there have been no such catastrophes, and all the infections have subsided without complications. If there is believed to be a mixed infection with the hemolytic streptococcus as one of the etiologic agents, the administration of sulfanilamide is advisable along with radiation therapy. The lesion should never be treated surgically. In a few cases it is necessary to give blood transfusions, especially if the process does not localize within the first twenty-four hours.

#### ERYSIPELAS

In erysipelas, streptococci localize in the connective tissue spaces and in the lymph vessels, and chiefly in the most superficial layers of the chorion. They produce a cellular exudative inflammation of the skin and subcutaneous tissues. The disease usually lasts eight to fourteen days. Many reports of successful roentgen treatment have appeared in the literature for years. We have treated many cases, in both adults and infants. Radiation is practically specific so long as the disease remains local. The dose used is 160 r at 112,000 volts through 3 mm of aluminum, not only over the entire area involved but also well beyond the margin of the lesion.

#### PNEUMONIA WITH DELAYED RESOLUTION

Musser and Edsall<sup>11</sup> in 1905, and Edsall and Pemberton<sup>4</sup> in 1907 reported on x-ray therapy in cases of delayed resolution. My associates, Drs Merritt and McPeak,<sup>9</sup> in 1930 reported on a series of such cases treated with roentgen radiation. Of the 7 cases reported, 4 underwent complete resolution, 2 were markedly improved and 1 was unchanged. We have treated many cases since the above report, with favorable results. It is believed that irradiation should be instituted if resolution does not take place at the time when it is usually ex-



pected. There have been no untoward symptoms following treatment.

#### LOBAR PNEUMONIA AND BRONCHOPNEUMONIA

Since the excellent report by Powell<sup>14</sup> on roentgen therapy of lobar pneumonia we have treated 13 cases of pneumonia with irradiation. Our results were quite as favorable as those reported by Powell. In 6 of these cases the type of pneumococcus was not reported, however all were clinically diagnosed as pneumonia, and all showed radiographic evidence of lobar consolidation. Five patients recovered either by lysis or crisis. One had consolidation on the left side which cleared rapidly after irradiation. A few days later there was a rise in temperature and a radiograph of the lungs revealed a beginning consolidation on the right side. The clinician refused to have radiation applied to this area and the patient died, this being the only death in the entire series. Of the 7 other cases, 3 were due to Type 1, 1 to Type 3, and 2 to Type 4, 1 was diagnosed as bronchopneumonia, the type not being reported. Five patients recovered by crisis and 2 by lysis. All these cases were treated with a dose of 200 to 300 r at 200,000 volts through 0.5 mm of copper, applied over the area involved. Only one treatment was required in most cases, and two in a few others. Crisis took place in most cases within twenty-four hours after treatment, and the usual course of the disease was much abbreviated. Radiation therapy is undoubtedly of marked benefit in this too common disease, and should be used more generally. We have found no harm resulting from moving the patient to the x-ray room for therapy.

#### CERVICAL ADENITIS

It has been known for many years that cases with either tuberculous or acute cervical adenitis respond to x-ray therapy.<sup>8, 14</sup> Such treatment is now well recognized as a method of choice in tuberculous adenitis, but only more recently has such treatment for adenitis accompanying the acute and chronic infections of the upper respiratory tract received wide attention. Pfahler and Kapo<sup>12</sup> in 1934 reviewed 333 cases of cervical adenitis of varying degree, both acute and chronic. They, and also their surgical colleagues, were convinced of the superior therapeutic value of roentgen irradiation. The majority of the patients were cured in from two to four treatments, with no skin atrophy and no telangiectasis. Hurwitz and Zuckerman<sup>8</sup> reported an experimental study of this method of treatment in children. Alternate cases admitted to the ward were selected for radiation treatment as the only form of local therapy. The others were treated by the usual medical

procedures,—compresses and ointments,—and served as controls. General nutritional measures were the same in each group. Only cases with marked enlargement of the lymph nodes, potentially suppurative, were included. The symptoms included fever (100°F or over), local pain at the site of the swollen nodes, anorexia, sleeplessness, irritability and occasional stiff neck. There was usually accompanying pharyngitis, tonsillitis or otitis. Staphylococci and streptococci were cultivated from the throat and nodes. The cases treated with radiation slightly outnumbered the controls because toward the end of the study, since x-ray treatment had proved obviously superior to other therapeutic measures, all patients were so treated. The authors make the following observation with regard to the immediate effect of treatment:

'One of the most striking results of roentgen therapy was the rapid improvement in the constitutional symptoms. A pronounced drop in temperature occurred in twelve to forty-eight hours with marked relief of pain and discomfort in the majority of cases. The swelling receded and resolution was complete in a shorter time than occurred when the usual medical procedures were employed. In an occasional instance, within a few hours after radiation, there was a temporary exacerbation of symptoms with increased temperature and local swelling. This reaction subsided within twelve to twenty four hours and no untoward effects remained. With the small dose of x rays employed, symptoms of radiation sickness, such as nausea and vomiting, were not encountered. Skin reactions did not occur.

A partial summary of the results are as follows:

'Sixty-two children with acute cervical adenitis were treated with small doses of roentgen rays. Resolution occurred in 52 (83.9 per cent) cases, while 9 (14.5 per cent) terminated in suppuration. In a group of 21 adequately controlled hospitalized patients who were irradiated, 17 (81 per cent) were cured as opposed to 10 (58.8 per cent) treated by other measures. Suppuration resulted in 3 (14.3 per cent) of the cases treated with x rays as opposed to 7 (41.2 per cent) in the control group.

In the large series of cases we have treated, the results have been so satisfactory that all the cases at one of our hospitals are now referred for x-ray therapy. If the node becomes fluctuant, it is aspirated with aseptic technic, thus giving good cosmetic results. The dosage given is 100 to 160 r at 112,000 volts through 3 mm of aluminum. The treatment is repeated on alternate days until three have been given.

#### SINUSITIS

My associate, Dr. Rathbone,<sup>15</sup> has recently reported on the favorable results obtained in the x-ray therapy of diseases of the accessory nasal sinuses. The matter is of extreme importance because sinus disease in children is now known to be

is typical of the methods used and the results obtained in the treatment of inflammation. He produced mastitis in guinea pigs by intramammary injection of *Staphylococcus aureus*. The lesions were then treated with 320 r of roentgen ray. It was found that, on the average, irradiation shortened the course of the disease and usually prevented breaking down of the tissues. Wright's opsonic and leukocytic indices were used in determining the changes in blood immunity produced by x-ray. In early infections these indices were raised after irradiation, in advanced suppuration they increased or remained constant. With this experience as a basis for treatment, Pfalz treated 41 cases of human mastitis with small doses (50 to 60 r) of x-rays. The series included both early and late cases. This method of treatment proved distinctly superior to other forms. There were no ill effects and no disturbance of lactation. We have treated a small number of cases of postpartum mastitis, and have had uniformly good results. In the cases which were referred in the early stages of the disease, there was prompt subsidence without suppuration. Unfortunately, most of the cases were referred late, the usual treatment with ice pack had already been used and the inflammation had continued to spread. Following x-ray therapy the pain increased for about six hours and then usually subsided, the process became localized, and either there was spontaneous rupture of the abscess or surgical intervention was resorted to, with drainage of the localized abscess. In all cases the referring obstetricians believed that the x-ray therapy shortened the course of the disease and localized the process. The dose given was 160 r at 112,000 volts, filtered through 3 mm of aluminum. This was repeated if necessary in three days. In no case did the treatment interfere with subsequent lactation.

#### ACUTE MASTITIS

Among 500 cases of inflammatory lesions treated there were 32 of acute mastitis. Five of these were in male adolescents. The breast and often the axillary glands were painful. Trauma was of etiologic importance in some cases. Usually there was no known predisposing factor. In none of the cases was there any suggestion of malignancy. The results of treatment were excellent, and the inflammation subsided after one to four treatments, without suppuration. A dose of 160 r was given the first day, followed by 100 r on alternate days until four treatments had been given.

#### FURUNCLES AND CARBUNCLES

X-ray therapy is especially successful in the treatment of furuncles.<sup>3,6</sup> If the case is seen

early, before the induration is great, resolution without suppuration may be obtained in a large percentage of cases. It is also beneficial in the later stages in bringing about softening and localizations as well as prompt healing of the incision if one is necessary. The most striking effect in both furuncles and carbuncles was the quick relief from pain, nearly always within twenty-four hours and usually in six to eight. Excellent results were obtained in recurring crops of furuncles, in the absence of such underlying diseases as diabetes.

Radiation therapy is of the greatest use in furunculosis of the upper lip, nose and face. When the infection is of sufficient virulence, there is marked lymphangitis and thrombophlebitis. Infection from facial lesions not infrequently spreads early to the vessels of the brain, with a fatal termination. In our series of 27 cases there have been no such catastrophes, and all the infections have subsided without complications. If there is believed to be a mixed infection with the hemolytic streptococcus as one of the etiologic agents, the administration of sulfanilamide is advisable along with radiation therapy. The lesion should never be treated surgically. In a few cases it is necessary to give blood transfusions, especially if the process does not localize within the first twenty-four hours.

#### ERYSIPELAS

In erysipelas, streptococci localize in the connective tissue spaces and in the lymph vessels, and chiefly in the most superficial layers of the chorion. They produce a cellular exudative inflammation of the skin and subcutaneous tissues. The disease usually lasts eight to fourteen days. Many reports of successful roentgen treatment have appeared in the literature for years. We have treated many cases, in both adults and infants. Radiation is practically specific so long as the disease remains local. The dose used is 160 r at 112,000 volts through 3 mm of aluminum, not only over the entire area involved but also well beyond the margin of the lesion.

#### PNEUMONIA WITH DELAYED RESOLUTION

Musser and Edsall<sup>11</sup> in 1905, and Edsall and Pemberton<sup>4</sup> in 1907 reported on x-ray therapy in cases of delayed resolution. My associates, Drs Merritt and McPeak,<sup>9</sup> in 1930 reported on a series of such cases treated with roentgen radiation. Of the 7 cases reported, 4 underwent complete resolution, 2 were markedly improved and 1 was unchanged. We have treated many cases since the above report, with favorable results. It is believed that irradiation should be instituted if resolution does not take place at the time when it is usually ex-

## REPORT ON MEDICAL PROGRESS

## SURGERY OF THE SYMPATHETIC NERVOUS SYSTEM

REGINALD H. SMITHWICK, M.D.\*

BOSTON

THE clinical importance of surgery of the sympathetic nervous system is becoming more certain from year to year. Much can now be accomplished to alleviate suffering and to improve function which was impossible even a few years ago. The full scope of this type of surgery is unknown as yet, and further progress in this field may be expected in the future.

The detailed anatomy and physiology of the sympathetic nervous system is quite complicated. Various aspects have been well described by White<sup>1</sup> and others.<sup>2,3</sup> The facts necessary for everyday clinical application may be summarized in a comparatively simple manner.

From the anatomical viewpoint, we should first realize that this system is represented by a continuous nerve trunk which lies in the paravertebral region on either side of the spinal column, and extends from the base of the skull to the end of the spine. It is divided into the cervical, thoracic, lumbar and sacral portions. Every few centimeters along its course is an enlargement, called a ganglion. There are three in the cervical region, usually twelve in the thoracic portion, corresponding to each rib, four in the lumbar, and four or five in the sacral area.

We are concerned chiefly with the thoracic and upper lumbar areas, because it is only in these that any connection with the central nervous system exists. Thus, so-called communicating rami run between the thoracic and upper two or three lumbar ganglia and the peripheral nerves, over which impulses may pass from the central to the sympathetic nervous system or vice versa. These are known as white rami. Other rami, grey, also exist, but are of importance chiefly as a method of distributing impulses, which have already entered the previously described portion of the sympathetic nervous system, to all organs and tissues of the body, or to transmit impulses from remote areas back to the thoracolumbar portions of the sympathetic trunk. Thus it is seen that we are dealing with two pathways, first, a motor or efferent and, second, a sensory or afferent pathway. In this respect, the sympathetic nervous system can be compared to an ordinary peripheral nerve, such as the sciatic.

The motor pathway, starting in the lateral horn

of the grey matter of the spinal cord, passes out over the anterior root of an ordinary peripheral nerve, then gains the sympathetic trunk by passing over a white communicating ramus and terminates in a ganglion. It then commences again, this interruption being known as a synapse. Instead of continuing as a single fiber, however, many fibers arise which eventually terminate in some organ or tissue and pass over grey rami in their course. The first portion of this motor pathway is known as the preganglionic division, and the second as the postganglionic. One preganglionic fiber thus controls the destiny of many postganglionic fibers. This differentiation is important because we have learned from long experience that the best clinical results are obtained by interrupting the first or preganglionic rather than the second or postganglionic portion of the pathway.<sup>4,5</sup>

The sensory or afferent pathway is less complicated and has no interruption from its origin in a viscus to its termination in a posterior-root ganglion of a peripheral nerve. Moreover, the various organs of the body have a segmental reference in the spinal cord (Table 1).

TABLE 1 Location of Referred Pain\*

ORGAN	SUPERFICIAL AREA OF REFERRED PAIN	SEGMENTAL CONNECTIONS OF AFFERENT NEURONES
Spinal cord (meninges)	Side of scalp and face	T 1 — T 2
Heart	Precordium and inner arm	T 1 — T 5
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Ureter	Loin and groin	L 1 — L 2
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Uterus	Suprapubic region and low back	T 12 — L 2

The tabulation varies slightly from that suggested by White.<sup>1</sup>

While the pelvic viscera have a segmental reference in the lower thoracic and upper lumbar segments of the cord, the great majority of both the motor and sensory pathways can apparently be interrupted by resection of the superior hypogastric plexus. This lies between the common iliac arteries, on the anterior surface of the body of the fifth lumbar vertebra in a retroperitoneal position.

It is helpful to think of the sympathetic network as a very complicated affair in the peripheral portions of the body, but as a much more simple affair as we approach the spinal cord. There is a 'bottle neck' through which impulses must pass

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It seems certain that a considerable percentage of such cases can be cured by x-ray treatment and a certain smaller percentage greatly improved.<sup>12 13</sup> As the number of our cases increases, the more firmly are we convinced of the efficacy of the treatment, if the cases are chosen with discretion. The technic used is 100 to 120 r at 112,000 volts through 5 mm of aluminum to each area, repeated until six series of treatments have been given. The three areas used are the right and left lateral face and one anterior face.

#### SUMMARY

Cases of inflammatory diseases make up one third of all those referred to our laboratories for x-ray therapy. Their relative frequency is as follows: cervical adenitis, cellulitis, furunculosis, mastitis, sinusitis, bronchitis, carbuncle, pneumonia, breast abscess and erysipelas, with a few others of infrequent occurrence.

X-ray therapy of inflammatory diseases has proved a valuable and safe agent in the hands of qualified radiologists and its field of use is being extended daily. The best results can be achieved when there is a close co-operation between the referring doctor and the radiologist in the management of all such cases.

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The success in the use of this valuable adjunct to the treatment of infections should make us realize the importance of familiarizing ourselves and our associates with its worth, not only in this group where one of the most important therapeutic agents is radiation therapy, but also in that large group of cases discussed in this paper, where x-ray treatment is a valuable adjunct. As stated, one third of the cases in the reader's clinic were referred for radiation of inflammatory lesions.

I am pleased to learn that Dr. Coe and his associates are so conservative with their roentgen doses, giving from one third to one half of a skin erythema dose, thus avoiding any possibility whatsoever of skin changes.

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be neurogenic in origin. There appears to be an improper balance between the sympathetic (inhibitory) and the parasympathetic (motor) innervation of the colon. Beneficial results have been reported following lumbar sympathectomy when the imbalance is chiefly confined to the left colon. Resection of the splanchnic nerves as well may be necessary if the right colon is involved.<sup>8</sup>

*Essential Hypertension.* Surgical attempts to alleviate high blood pressure of unknown etiology have stimulated widespread interest in this problem. The internist,<sup>9</sup> the surgeon and the physiologist<sup>10-11</sup> are all concerned themselves with the study of essential hypertension. As a result of such combined effort, it is to be hoped that a clear understanding of the nature of this malady will result.

Sporadic attempts to lower blood pressure by sympathectomy have been made in the past,<sup>12</sup> but most of the cases are of only a few years' duration, so that the results are difficult to analyze. A number of operations<sup>12-13</sup> have been devised, the purpose and the effects of which are similar.<sup>12-24</sup>

It is commonly thought that high blood pressure is due to increased peripheral resistance to blood flow. By sympathectomy, this resistance is presumably decreased so that a lower blood pressure level results.

It has been shown that significant blood-pressure changes follow extensive sympathetic denervation of the splanchnic bed and that a normal blood-pressure level may result from such an operation without harm to any organs or tissues of the body, and with relief of distressing symptoms which may result from high blood-pressure levels. This effect may be lasting, and many patients have had normal blood-pressure levels for from two to six years after such a procedure. It has been demonstrated that the best results are obtained in young age groups with variable blood pressure levels and with minimal evidence of organic changes in the eyes, heart and kidneys.

Even under these circumstances the results are not uniform. Moreover, our experience during the past five years shows that results as described above are obtained only in 40 to 50 per cent of the favorable cases. The experience of others is similar. In the groups with advanced organic vascular changes, a material lowering in blood-pressure levels can be expected in only 5 or 10 per cent of the cases although symptomatic relief may be marked.

The surgical attack on this disease must still be regarded as in an experimental stage. It takes many years of trial and error to determine the most effective method of denervating any portion of the

vascular bed, and the lack of uniformity of results in identical cases leads one to suspect that this has not as yet been accomplished with regard to the splanchnic bed. Further observation of late results will be necessary to determine the indications for and the true value of sympathetic surgery for this disease.

#### SURGERY OF THE SENSORY PATHWAYS

A knowledge of the sensory pathways from various organs to the central nervous system and of their segmental reference in the spinal cord is of primary importance because of its diagnostic possibilities. In this way one can explain why pain arising in an organ as the result of what happens to be an adequate stimulus for that particular viscus will be felt by the patient in a certain region. It is often referred peripherally over a number of segments adjacent to the white rami over which the impulse passes to reach the posterior root ganglia. Tension is the usual stimulus which results in visceral pain. In the case of peripheral arteries and muscles the stimulus is probably the result of increased concentration of acid metabolites in the tissues.

*Pain in the Head, Face and Arms.* One is occasionally confronted with the problem of pain in the head, face and arms, and the afferent sympathetic pathways are often concerned. That this is the case, can be determined by diagnostic paravertebral novocain block of the upper two or three thoracic segments. It is interesting to note that when relief from novocain alone is immediate and striking, it may last for weeks or months. Permanent relief of atypical neuralgias of the head and face may follow resection of the inferior cervical and upper two dorsal sympathetic ganglia.

*Causalgia.* Following injuries or infections of the hand, an exceedingly painful causalgia may result. These cases present most distressing problems. As a rule, both motor and sensory sympathetic pathways are involved, as well as the somatic sensory nerves. There may also be a local fault in the form of scar tissue, a neuroma or an unsatisfactory amputation stump. In some instances sympathectomy may have to be combined with excision of local scar tissue and resection of the peripheral sensory nerves. A similar lesion of the lower extremity is occasionally seen.

*Angina Pectoris.* Paravertebral alcohol injection of the upper four or five dorsal segments on one or both sides, as indicated by the distribution of referred pain, has resulted in lasting and satisfactory relief of pain in cases of intractable angina pectoris. In skillful hands, practically complete re-

to and from any particular part of the body in order to leave or enter the central nervous system. The problem is to find the "bottle neck." In many instances this is now known beyond any doubt, in others we are in the process of learning. It seems certain however, that if the correct operation is performed, excellent and lasting effects can be obtained.

We now believe that interruption of sympathetic pathways is indicated in a number of well-recognized clinical conditions. These are best divided into two groups, depending on whether the motor or sensory pathway is concerned.

The result to be expected in any case can be determined by preliminary study. Both motor and sensory pathways can be blocked temporarily by novocain in a number of ways.<sup>1</sup> Other important tests are also utilized. Space does not allow a discussion of these. One should understand, however, that operation is not undertaken unless it has first been demonstrated that the effect will be beneficial.

#### SURGERY OF THE MOTOR PATHWAYS

*Peripheral Vascular Disease* By far the largest general field of application for surgery of the motor pathway is in the treatment of peripheral vascular disease. Many patients suffer from inadequate blood flow to the extremities for a variety of reasons. In some cases, decreased circulation may be largely the result of vascular spasm, as in Raynaud's disease and allied disorders. In others, obliteration of the main vessels is present, and the element of spasm is minimal or absent. Arteriosclerosis with associated diabetes is an example. Other patients suffer from a combination of obliterative vascular disease and vascular spasm, such as is found in thromboangitis obliterans or Buerger's disease. When vascular spasm alone is present, brilliant results may be expected from a properly executed sympathectomy. When obliteration of main vessels is the cause of impaired circulation and spasm is absent, interruption of sympathetic pathways is not helpful and is not indicated. When a combination of the two factors is present, sympathectomy may be indicated and, if so, usually results in an improved circulation which is lasting and beneficial.

Most cases of peripheral vascular disease may be fitted into one of these three groups as a result of clinical study and tests designed to determine the amount of vascular spasm which may be present.

*Anterior Poliomyelitis* Impaired circulation to the lower extremities may follow infantile paralysis. This situation, of course, is not to be grouped among primary vascular diseases, and is compli-

cated by extreme muscular weakness, atrophy and diminished blood flow to the skin and subcutaneous tissues. In extreme examples with cold, moist, cyanotic, ulcerated extremities, sympathectomy may be indicated. If properly done, the results have been helpful.

*Hyperhidrosis* Distressing examples of hyperhidrosis may be completely relieved by sympathectomy. There are occasional individuals who suffer from excessive perspiration which may involve all four extremities and cannot be controlled by medical measures. When present to this degree, it may be a great occupational and psychological handicap. Interruption of sympathetic pathways to such extremities causes complete abolition of sweating, as well as a vasomotor paralysis, and the results are regarded as extremely satisfactory by these patients.

*Sudden Arterial Occlusion* Sympathectomy may be an important adjunct to other forms of therapy in the case of sudden occlusion of peripheral arteries. This may be the result of embolism or thrombosis. It may be associated with primary disease of the peripheral artery or may, in the case of the upper extremity, be complicated by cervical ribs, anomalous first ribs or the scalenus anticus syndrome. The primary lesion should receive first consideration, but we realize that vascular spasm plays an important secondary role. If eradication of the primary lesion does not relieve the secondary spasm, or if the primary lesion is not amenable to surgical approach, sympathectomy may be indicated. Space does not permit an adequate discussion of this important group of cases.

*Sympathetic Surgery of the Extremities* The technic of operations designed to cause sympathetic denervation of the extremities has been reported in detail.<sup>6, 7</sup> In general it may be said that these procedures carry a minimal risk (a fraction of 1 per cent) and a short period of disability, and are now very well standardized. It seems unlikely that there will be any essential variations from the present technic in the future. Surgical excision of appropriate areas is the procedure of choice.

Paravertebral alcohol injection may be utilized as an alternative method. This is distinctly a second choice, as the results are usually incomplete, are not permanent and may be followed by distressing and prolonged peripheral neuritis, and so far as the motor pathway is concerned, such injections are done only when the general condition of the patient or the benefit to be gained does not appear to justify the operation of choice.

*Hirschsprung's Disease* Congenital dilatation of the colon (Hirschsprung's disease) is believed to



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We have had several occasions to treat referred pain arising from the biliary and upper gastrointestinal tracts by paravertebral alcohol injections or splanchnic resection. In these particular cases the results were most satisfactory. In one, repeated operations on the common duct failed to relieve severe colic, which was later controlled by resection of the right splanchnic nerves. In two others, severe referred pain from posterior-wall, penetrating, duodenal ulcers was relieved by paravertebral alcohol injection, as the condition of the patients did not justify eradication of the lesion itself.

*Genitourinary-Tract Pain.* In certain cases sympathectomy may be helpful in dealing with problems involving the genitourinary tract. This is particularly true of the relief of pain, although some improvement in abnormal motor function of the bladder may be expected under the proper circumstances.

The bladder has a triple nerve supply, and it is the function of the sympathetic portion to permit filling of this organ. Sympathetic impulses cause relaxation of the bladder wall and contraction of the internal sphincter. Parasympathetic impulses produce the opposite effect. When the latter pathway is damaged, inability to empty the bladder results in a large residual and, later, damage to the kidneys from back-pressure and infection. Under such circumstances, resection of the sympathetic supply by excision of the superior hypogastric plexus has given good clinical results. One should be certain, however, that the third source of nerve supply—the somatic nerves arising from the third and fourth sacral segments—is intact, as paralysis of the external sphincter con-

traindicates excision of the sympathetic nerves. The information necessary to make a decision in a given case can be obtained by a combination of cystoscopy and paravertebral novocain block.

Renal and ureteral colics of unknown etiology have been relieved by interruption of the afferent sympathetic pathways. The kidney itself can be denervated by careful resection of the sympathetic plexus about the renal vessels. Ureteral pain has been relieved by dividing its nerve supply throughout its length and by displacing the ureter laterally to aid in preventing regeneration. Lumbar sympathectomy should also help in such cases.

Bladder pain is a more complicated matter, as the sensory nerves pass over three different pathways—the sympathetic, parasympathetic and somatic. The sympathetic pathway is perhaps the least important, and for this reason resection of the superior hypogastric plexus alone has not yielded very satisfactory results in the treatment of such conditions as tuberculous cystitis, interstitial cystitis and cancer, except where the lesions are chiefly confined to the trigone and about the ureteral orifice. Resection of the superior hypogastric plexus and removal of the upper three sacral ganglia, combined with carefully controlled intrathecal alcohol injections, have given good results in a variety of painful bladder conditions.<sup>5</sup> It must be emphasized that resection of the superior hypogastric plexus in men may result in inability to ejaculate and consequent sterility.

Very satisfactory results have been obtained by resection of the superior hypogastric plexus for dysmenorrhea. This should, of course, be done only in the most intractable cases. Resection was first suggested by Cotte<sup>26</sup> and has proved satisfactory in the hands of others. Meigs<sup>28</sup> has contrasted the results in 20 cases in which resection alone was done with those in 7 cases in which other procedures such as dilatation of the cervix and suspension of the uterus were carried out in addition to resection. In the first group satisfactory results were obtained in 75 per cent of the cases, while in the second group, complete relief of symptoms followed in all but 1 patient. Sufficient observations are on record so that it may be stated that no material change in the menstrual cycle follows, and pregnancy and parturition are not affected by this operation. Satisfactory relief of pain also followed this operation in cases of advanced cancer of the cervix and uterus in which bony metastases and involvement of pelvic nerves had not taken place.

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of shaking chills and fever. At 4 a. m. he vomited approximately a pint of dark-brown material. At 5.30 a. m. he suddenly experienced a sharp pain beginning in his right side, extending across the right upper quadrant beneath the costal margin to the epigastrium. The pain lasted about five minutes, but soreness remained in this area. Similar attacks of pain recurred throughout the day and in the afternoon he vomited clots of blood. There had been no change in weight since the last admission.

Physical examination revealed a slightly pale man in no distress. There was no dyspnea or cyanosis. Examination of the lungs was normal. The heart sounds were normal in rate, rhythm and quality. The blood pressure was 120 systolic, 60 diastolic. The abdomen was soft, and peristalsis sluggish. An indefinite mass was present in the left lower quadrant which was tender just to the left of and below the umbilicus. Rectal examination revealed a symmetrically enlarged prostate.

The temperature was 98.6°F, pulse 80, respirations 20.

The urine examination was negative. The blood showed a red-cell count of 3,170,000 with 75 per cent hemoglobin and a white-cell count of 13,000 with 81 per cent polymorphonuclears. There was considerable variation in the size of the red cells. A blood Hinton test was negative. The nonprotein nitrogen of the serum was 59 mg. per cent. Four stool examinations were guaiac positive.

A barium enema examination showed that the sigmoid looped high out of the pelvis and remained fixed in that position. There was an impression that there was an extrinsic tumor posterior to the sigmoid in this area, although no definite tumor mass could be made out on the film. The remaining colon and cecum were normal.

On the third hospital day a gastrointestinal x-ray series showed a large amount of barium in the colon from the previous examination. The appendix was filled at this time. The hepatic flexure partially obscured the region of the duodenal cap. As far as could be told there was no evidence of abnormality in the stomach or duodenum. An intravenous pyelogram was negative. Four days later a repeat gastrointestinal series was essentially the same as the previous one. The stomach was high, the duodenum pointed posteriorly and was rather difficult to examine. On the seventh hospital day the temperature rose from normal to 102°F., and on the eighth day to 103°F. then returned to normal. Respirations remained at 20. On the eleventh hospital day a cystoscopic examination showed a normal bladder and no significant enlargement of the prostate. The following day gastroscopy showed a normal stomach.

The pylorus was not seen. Two days later the temperature rose sharply to 103°F., respirations to 30. The right arm was swollen and hot. On the fifteenth hospital day the patient was moribund. There was dullness at the right lung base and numerous crackling rales. Rales were also present over the left base. An indefinite mass was palpated in the left lower quadrant, and pressure over this area caused pain. A blood culture showed hemolytic streptococci. The patient rapidly failed and died on the sixteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. F. DENNETTE ADAMS. The two admissions to the hospital will be discussed separately. At the first admission four important symptoms require explanation: (1) vomiting of blood, (2) pain, (3) increasing constipation, (4) loss of weight occurring in spite of a presumably adequate diet.

The pain is of the obstructive type. Its distribution is most suggestive of an obstructive lesion in the colon, a hypothesis which is further borne out by the fact that the patient was aware of a "lump" in the right upper quadrant which, along with the pain, would disappear following a bowel movement or passage of gas.

Hematemesis most commonly results from peptic ulcer, gastritis, esophageal varices, gastric polyp, or cancer. The history is not suggestive of peptic ulcer or gastritis, although either sometimes exists without characteristic pain related to food intake. Nor are there any symptoms to make one suspicious of cirrhosis of the liver with resultant esophageal varices. Gastric polyp might be a cause of the bleeding but would not explain pain of this character.

If then, we rely on history alone—that is all we are considering at this point—the most plausible explanation of the illness is cancer of the stomach. Increasing epigastric pain, loss of weight, hematemesis and increasing constipation are all readily explainable on this basis, involvement of the colon with partial obstruction could be due to extension of the tumor with invasion of the transverse colon.

Physical examination contributes very little. The harsh systolic murmur at the base may indicate calcareous disease of the aortic valve with some degree of stenosis, but the evidence is inconclusive. Nothing is said about a thrill, or diminution of the aortic second sound. The pulse pressure of 80 is decidedly against aortic stenosis, one of 20 or 30 would be more convincing. Absence of a palpable mass does not necessarily exclude cancer of the stomach, but one would hardly expect the patient to have a gastric cancer sufficiently extensive to involve the transverse colon.

## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25111

#### PRESENTATION OF CASE

*First Admission* A seventy-two-year-old married English farmer was admitted complaining of abdominal pain.

About six months before admission the patient began having attacks of cramp-like pain in the right lower quadrant which seemed to move slowly upward to the right upper quadrant. These attacks lasted about five minutes and occurred at one- to five-day intervals. They were always relieved by defecation or the passage of gas. During these six months he also had epigastric distress with a feeling of fullness accompanied by belching and sometimes regurgitation of sour material. This distress usually came on after breakfast and was somewhat relieved by taking soda. At times he had mild, non-radiating epigastric pain. Occasionally he also noted a "lump" in the right upper quadrant which would disappear after the pain had gone. On some occasions the pain was made worse by food and relieved by soda. There was no definite relation to meals or to the type of food eaten. During the past year he had been constipated whereas previously his bowel movements had been regular. At times during the last six months he had noticed dark stools and on a few occasions a small amount of bright-red blood. He stated that his appetite had been poor for a year but that until recently he had eaten about the same amount that he always had. He felt that he had lost a considerable amount of weight during the last six months, but had not actually weighed himself. Five days before entry he felt somewhat nauseated and vomited about a half cupful of bright-red blood. He had not vomited previously. Later the same day he vomited some very dark, thick fluid. During the next two days he vomited a similar material. There was no emesis during the last two days although he felt nauseated. He had not had severe right upper-quadrant pain, icterus or clay-colored stools. There had been no abdominal tenderness or swelling and no pain that awakened him at night. His past and family histories were noncontributory.

Physical examination showed an obese elderly man in no distress. Examination of the lungs was

normal. The heart did not seem to be enlarged. There was a harsh systolic murmur loudest over the aortic area.  $A_2$  was louder than  $P_2$ . The blood pressure was 148 systolic, 68 diastolic. The abdomen was soft and no masses or tenderness could be made out. By rectal examination the prostate was twice its normal size, but symmetrical and non-tender.

The temperature was 99°F, the pulse 100, respirations 24.

The urine examination was negative except for the presence of 10 to 15 white cells per high power field. The blood showed a red-cell count of 2,600,000 with 50 per cent hemoglobin, and a white-cell count of 7600 with 76 per cent polymorphonuclears. There was marked anisocytosis and many of the red cells were large, though all were well filled with hemoglobin. The volume index was 1, the color index 1. A blood Hinton test was negative. A bromsulfalein test of liver function showed 0 to 5 per cent retention. A Takata-Ara test was negative. Three gastric analyses showed free acid varying from 27 to 94 units, total acid from 67 to 100 units. One stool examination was guaiac positive, another guaiac negative.

A barium enema x-ray examination showed a large pressure defect for a distance of 20 to 25 cm in the sigmoid, due to a large "tumor" in the pelvis, apparently a full bladder. The remainder of the examination of the colon was negative. A gastrointestinal x-ray series showed a normal esophagus and a high stomach but was otherwise negative. Hourly follow-up films of the small intestine showed no abnormality aside from pressure on the lower loops of ileum apparently due to a filled urinary bladder.

On the fifth hospital day a Graham test was negative. The following day a proctoscope was passed a distance of 21 cm showing no obstruction. The rectal mucous membrane was granular and definitely pigmented. No cancer or ulcers were seen. During the next few days the patient felt well and his bowel movements were normal. He was discharged on the fourteenth hospital day.

*Final Admission* (six months later) Since discharge he had felt fairly well except for occasional mild attacks of epigastric burning sensations relieved by milk and crackers. He had had a few attacks of right upper-quadrant and epigastric pain associated with vomiting of small amounts of dark blood. These attacks passed off readily leaving only slight soreness in the epigastrium. Two days before admission he suddenly became nauseated about 9 p.m. and vomited, but there was no blood in the vomitus and he had no pain. From 10 p.m. to 4 a.m. he was unable to sleep because

of shaking chills and fever" Probably he did not have a true chill but only the chilly sensations which almost always accompany onset of fever

There is nothing in the second admission to influence me to change my diagnosis The gastroscopy ruled out even more completely cancer of the stomach, gastritis, and the less likely possibility of ulcer of the stomach It could not rule out ulcer of the duodenum

Why did the man die? The episode of chills, fever, and severe pain suggests perforation and of course, if he perforated something, it was undoubtedly the ulcerative lesion which we assume to be present Perhaps the process was sufficiently walled off to prevent general peritonitis Even so, he may have had general peritonitis for we know this condition can exist in debilitated patients without producing the usual picture In this case it is unlikely because of the interval of time between the onset of the acute episode and death Septicemia, secondary to perforation, embolic pneumonia, and an embolic lesion in the arm are the likely terminal features

The most plausible explanation which I can give of this man's illness is that he had malignant lymphoma causing an ulcerative lesion of the upper part of the intestinal tract, perhaps the lower duodenum or the upper jejunum, and enlargement of abdominal lymph nodes, and that he died of septicemia secondary to perforation of the ulcerative lesion Calcereous aortic disease may have been present but is of only secondary importance

DR. MALLORY On reading over the history as given to Dr Adams I found myself quite unable to make a diagnosis and yet the autopsy permission was filled out with the correct diagnosis when it came over to us I would be interested to know how they did it

DR. RALPH ADAMS An explanation should be made Everyone saw this patient from the senior surgeon of the hospital down to the house student The only one who had not seen the patient, and incidentally the youngest man on the service, saw him at three o'clock in the morning when he was discharging him to your department, read the history, and was the only person who made a correct diagnosis

#### CLINICAL DIAGNOSES

Malignant tumor of large intestine.  
Pulmonary infarcts  
Bronchopneumonia

#### DR. ADAMS'S DIAGNOSES

Malignant lymphoma with an ulcerative lesion of the upper part of the small intestine and involvement of abdominal lymph nodes  
General septicemia  
Septic bronchopneumonia  
Embolic infarct of the arm

#### ANATOMICAL DIAGNOSES

Duodenal ulcer, chronic  
Pulmonary atelectasis  
Melanosis coli  
Meningioma  
Basophilic adenoma of pituitary

#### PATHOLOGICAL DISCUSSION

DR. MALLORY The autopsy showed only one lesion of any significance That was a typical chronic duodenal ulcer The terminal episode was septicemia undoubtedly from phlebitis in the arm There was no mass anywhere in the lower abdomen The prostate was not significantly enlarged, the bladder was perfectly normal There was nothing in the lower intestinal tract

A PHYSICIAN Was the phlebitis possibly secondary to therapy?

DR. RALPH ADAMS It so happened he had not had an intravenous in that arm He had had one in the other arm

DR. RICHARD SCHATZKI Did he have multiple pulmonary infarcts?

DR. MALLORY No, foci of atelectasis and minimal bronchopneumonia

DR. F. DENNETTE ADAMS Had he no perforation?

DR. MALLORY No

DR. ADAMS Dr Mallory, what is the significance of the pigmentation of rectal mucosa noted on proctoscopic examination?

DR. MALLORY It was characteristic melanosis coli This is common in the seventies, very common in the eighties and, in my experience, universal in the nineties

I should, perhaps, for the sake of completeness mention two other findings There was a small meningioma of the dura, and microscopic sections of the pituitary show a small basophilic adenoma Certainly neither of them produced overt clinical symptoms, but one might speculate on their etiologic relation to the ulcer

without its being palpable. The prostate is large but is not described as being hard or asymmetrical, which is the usual story with carcinoma of this gland.

The blood count is consistent with anemia secondary to hemorrhage, although one would expect a low volume index and low color index. The polymorphonuclear count is relatively high. The normal liver function and Takata-Ara tests are added evidence against cirrhosis of the liver. The high gastric acidity is definitely against cancer of the stomach and, taken into consideration with the negative x-ray, seems to exclude this disease.

It now becomes necessary to look elsewhere for a solution of this problem and when we seek help from the roentgenologist we are further confused by being forced to account for a mass in the lower abdomen in addition to the symptoms referable to the upper abdomen. The roentgenologist's observation that a mass is present is doubtless correct, but I question his interpretation for these reasons: (1) An acutely distended bladder should cause lower abdominal discomfort or pain and probably a story of inability to void. (2) A chronically distended bladder secondary to obstruction, or a diverticulum of the bladder would probably cause some urinary symptom such as frequency and certainly an infected urine. Neither is reported in this case. What, then, are the diagnostic possibilities? The lower abdominal mass, judging from the roentgenologic appearance, is not an intrinsic tumor, so we can exclude cancer and multiple polyps of the lower bowel. The latter are further excluded by the proctoscopic examination, for, when multiple polyps are present, one or more can usually be seen. There is nothing to suggest diverticulitis with abscess. Furthermore, none of these disorders can account for the hematemesis. I do not know the significance of the pigmentation and the granular appearance of the rectal mucosa. Pigmentation is sometimes due to prolonged use of cascara.

Perhaps Dr. Holmes will demonstrate the x-rays.

DR. GEORGE W. HOLMES: In a case of this kind with so many films it is almost impossible to give intelligent information on short notice. In the records there is no statement that anything very definite was found. This film shows an appearance in the sigmoid which is sometimes seen when gut is stretched over a mass, and I would agree with what has been said, that the mass lies outside the colon and that the colon may be adherent to it or stretched over it. We have no evidence that there was a mass in the small bowel, but it is well known that a large mass may be present without producing obstruction, and unless

the examiner happens to make his observation at the time the barium is passing through the involved region it may be missed. Apparently that was thought of and a careful study done to rule out the small bowel, but nothing was found. I have not seen anything in this collection of films to lead me to believe that that observation was incorrect. His appendix is visible and well filled, it appears to be normal. I do not believe the mass was due to an abscess of the appendix or anything of that sort. He has a very wide duodenal loop, but there are no changes in the mucosa of the duodenum and no evidence of block, and a wide loop, particularly in a patient with a high stomach, is of no real significance although one might consider more carefully tumor in the head of the pancreas. The films of the urinary tract show the kidney outlines to be normal, the location is normal, and there is nothing unusual in the appearance of the kidney pelvis.

DR. ADAMS: It seems to me we can best explain this confusing clinical picture by making a diagnosis of malignant lymphoma. An ulcerative lesion high in the small intestine could account for the hematemesis, especially if there is partial obstruction and, as we know, a lesion in the small intestine is often overlooked by the roentgenologist. The lower abdominal mass could well be enlarged lymph nodes, mesenteric or retroperitoneal. The relatively high polymorphonuclear count would also fit in with the diagnosis of lymphoma. And as far as I can see, there is nothing in the picture which might exclude such a diagnosis. If lymphoma involves the stomach, the gastric acidity is usually low rather than high. However, in this case, we do not suspect a lesion in the stomach. I do not know what degree of gastric acidity is common in cases of lymphoma involving that intestinal tract. Some less common form of tumor, such as leiomyoma, I suppose should be mentioned, but there is no evidence for or against it.

On second admission, the story of feeling fairly well except for occasional attacks of epigastric burning, relieved by milk and crackers, is especially characteristic of gastric or duodenal ulcer. One can conceive of its being consistent with an ulcerating lesion somewhat lower down. This and the high gastric acidity are the only bits of evidence which we have in favor of peptic ulcer. There is no report as to how the man was treated between his first and second admissions and I wonder if by any chance he was given radiation.

DR. TRACY B. MALLORY: I am sure he did not have radiation. He may have been on a gastric diet.

DR. ADAMS: "He was unable to sleep because



## DIFFERENTIAL DIAGNOSIS

DR RICHARD SCHATZKI The patient was, so far as I remember, sent to the X-ray Department merely to exclude the possibility that there was anything wrong with the stomach or duodenum.

DR. MILES P. BAKER They evidently thought at the time that the emetine therapy had been a success, the fever was down.

DR. SCHATZKI I was surprised when I found this huge lobulated mass which was described in the record. It occupied the body of the stomach, like a bunch of big grapes. When you see such a mass in the stomach, particularly if it is lobulated, you like to see the stalk with which it is attached to the wall because that is the only possible way of differentiating a polypoid lobulated tumor and foreign material in the stomach. I was thinking of a case that had been discussed here recently in which I was not able to demonstrate such attachment. Because of the persistence of the shadow on several examinations I finally called it tumor, but it proved to be merely a blood clot. I therefore tried to demonstrate the attachment here and was not able to do so. In addition the mass moved within the stomach about 3 cm up and down. Nevertheless, the appearance of the mass was much more characteristic of a lobulated tumor than it had been in the other case. I did not have much doubt about the case, but because of the preceding one I asked for a gastroscopy. Unfortunately the patient's condition did not permit this.

DR. BAKER Is this mass in a position consistent with the physical finding of a firm mass in the left upper abdomen?

DR. SCHATZKI The position is consistent, but I would not expect this particular type of tumor to be very firm.

DR. BAKER Does it appear definitely intrinsic?

DR. SCHATZKI Yes, a definitely lobulated mass within the stomach.

DR. BAKER This is the story then of a man who for four or five months prior to hospital admission had a mild day-and-night diarrhea, watery movements of the sort that one finds in individuals who have an irritative lesion of the small intestine, as ileitis. There has been no tendency to alternating constipation and diarrhea. Prior to entry he developed acute colicky pain localized chiefly in the right lower quadrant. It is similar to that seen with mild, partial intestinal obstruction. As we read on we find this to be a case of diarrhea with negative barium enema, without evidence of inflammatory colitis or malignancy in the colon. It was evidently hoped that emetine would prove a

specific therapy if the man had amebiasis, but, despite the subsidence of fever as the case progressed, it proved to be a false hope. Prior to the putting up of these x-ray films I thought of certain possibilities in diagnosis, but I can no longer believe that they are tenable. One of them in view of the positive bromsulfalein retention was the possibility that the man had portal cirrhosis with a primary carcinoma of the liver. The finding of intrinsic tumor in the stomach makes this unlikely. I thought possibly it was a tumor in the left lobe of the liver causing extrinsic pressure defect in the stomach.

I think that the bromsulfalein test here sticks out like a sore thumb because it indicates extensive intrahepatic disease. A marked dye retention of 35 per cent at the end of half an hour is a rare finding in metastatic malignancy in the liver. The negative Takata-Ara test is not consistent with any diffuse disease of the liver but is the rule with metastatic malignancy in the liver. Dr. Clark Heath reported positive Takata-Ara test in 60 per cent of cases of portal cirrhosis.\* Dr. Neil L. Crone says that in this hospital all the cases of obvious decompensated portal cirrhosis have a positive Takata-Ara test, but only 75 per cent of so-called compensated portal cirrhosis have a positive test. One finds generally that the Takata-Ara test findings do not tally well with other tests of liver function. The negative Takata-Ara test here is consistent then with cirrhosis of the liver, without ascites, and is to be expected if he has metastatic malignancy in the liver.

Secondly, I considered the possibility that this man had carcinoma of the body of the pancreas developing as an epigastric mass above the lesser curvature of the stomach and causing pressure defect with marked metastasis to the liver. Carcinoma of the pancreas sometimes begins with diarrhea. On the whole we have very little evidence that there is such a disease, to judge from the x-ray findings. I believe cancer of the pancreas can involve the transverse colon. I suppose it is conceivable that it involves the stomach wall too, but that must be a very rare finding. A third possibility is lymphoma, producing irritative symptoms in the small intestine. His symptoms began with gradual decrease in strength, with attacks of colicky pain consistent with mild intestinal obstruction. Evidence of liver involvement developed from the laboratory examinations and eventually a tumor of the stomach was demonstrated. Lymphoma may diffusely infiltrate the liver in such fashion as to account for the evidence by laboratory test of diffuse intrahepatic disease. Cer-

\*Heath, G. W. The Takata-Ara test in the diagnosis of liver disease. New Eng. J. Med. 211:10-11, 1934.

## CASE 25112

## PRESENTATION OF CASE

A fifty-year-old married Canadian carpenter was admitted complaining of lower abdominal cramps of ten days' duration.

The patient was entirely well until he noted the insidious onset of painless watery diarrhea five months prior to admission. This continued with a frequency of four to six movements per day, some occurring at night, without mucus, blood or pus. His appetite remained good and he had no nausea or distention. Twelve days before entry, without apparent precipitating cause, cramp-like lower abdominal pains began, recurred at intervals of a few minutes to three hours, day and night, and lasted until entry. They seemed to be somewhat aggravated by eating. The pain was of a spasmodic nature, "like something turning inside," not localized to a definite area. It began in the right lower quadrant, but during the first night moved into the epigastrium. During the last few days it had also involved the entire lower abdomen and the left flank. His diarrhea continued. There was no relief of pain after a bowel movement. He vomited only once, five days before admission, after taking "creamy" medicine ordered by his physician. A tender area developed just below the xiphoid in the midline. He had lost 15 pounds in weight during the last six months. He had not had chills or fever. No questionable food, water or milk had been ingested and no one with whom he was associated had a similar condition. His past and family histories were non-contributory.

Physical examination showed a dehydrated man having episodes of acute abdominal distress. Examination of the chest was negative. The blood pressure was 115 systolic, 65 diastolic. The abdomen was soft. There was a small tender area just beneath the xiphoid in the midline, apparently over the left lobe of the liver. There was no tenderness on percussion over the right costal margin. No organs or masses were palpable.

The temperature was 101°F, pulse 65, respirations 25.

The urine examination was negative. The blood showed a red-cell count of 3,700,000 with 70 per cent hemoglobin and a white-cell count of 12,200 with 78 per cent polymorphonuclears, 20 per cent lymphocytes, 2 per cent eosinophils. The red cells showed slight anisocytosis. The serum nonprotein nitrogen was 20 mg per cent, the chlorides 101 milliequivalents. A van den Bergh test was normal, indirect. A bromsulfalein test of liver function showed 35 per cent retention of the dye. A Takata-

Ara test was negative. Several blood cultures showed no growth. A stool examination was guaiac negative. A stool culture showed no pathogenic organisms. Typhoid and Paratyphoid A and B agglutination tests were negative. An undulant fever agglutination test was weakly positive in all dilutions from 1:40 to 1:1280.

A barium enema x-ray examination was negative.

On the third hospital day the patient's temperature had risen to 104°F. Tenderness in the epigastrium was more marked, and percussion over the right costal margin was quite painful. The pulse was only 80, despite the high temperature. The spleen was not palpable. There were no rose spots. A proctoscopic examination showed a slightly pale and edematous mucosa. There were no ulcers. An examination for amebae was negative. Two days later the liver remained tender, but the temperature was lower and the patient was symptomatically improved. On the seventh hospital day an x-ray of the chest showed a diaphragm unusually high on the right. The right lower lung field showed decreased radiance apparently due to pressure atelectasis. Emetine hydrochloride therapy had been started on the third hospital day and given daily. On the ninth hospital day the temperature had returned to normal. On the following day a stool examination was guaiac positive. A gastrointestinal x-ray series taken on the fourteenth hospital day showed a lobulated mass occupying the upper half of the stomach. However, a re-examination was requested to rule out foreign material. Three days later a fixed, firm mass was palpated in the left epigastrium. The liver was enlarged and nodular, extending 4 cm below the right costal margin. A repeat gastrointestinal x-ray series at this time showed a lobulated mass in the stomach.

Again it was not possible to demonstrate a definite attachment of this mass to the stomach wall. The mass seemed to lie slightly lower in position than on the previous examination. On the twenty-first hospital day the patient vomited yellow mucoid material which was guaiac negative. One day later he vomited 100 cc of reddish fluid which was guaiac positive. Jaundice was noted at this time and a van den Bergh test was diphasic with 7.35 mg per cent bilirubin. The liver continued to enlarge. On the twenty-third hospital day the upper border was at the fifth rib, the lower edge 8 cm below the costal margin in the right mid-clavicular line. The patient continued to vomit reddish-brown, guaiac positive material and the jaundice deepened. He rapidly failed and died on the thirty-second hospital day.

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## A MEDICAL HISTORIAN LOOKS AT SOCIALIZED MEDICINE

It is not easy in these times for anyone even to try to investigate certain aspects of socialized medicine. The very fact that a physician makes an effort to collect data from the Soviet Union and other places puts him, in the minds of many of his colleagues, far to the left and even attaches to him a red tag. Because of this, great credit should be given to any individual who has the courage to investigate Soviet medical practices thoroughly, although the fact that his passport carries a Russian visa gives him, to some more narrow-minded individuals, a distinct stamp of disapproval. Whatever may be the individuals' feeling about the matter, one cannot ignore the fact that the socialization of medicine is already largely accomplished in certain countries and that steps in that

direction are discernible even in democratic countries such as ours. One hears so much against socialized medicine that it is rather refreshing to find a medical historian looking at the subject, as a historian should, from an impartial point of view. Unquestionably the world's leader in the history of medicine at the present time is Dr. Henry E. Sigerist, the head of the Johns Hopkins Institute of the History of Medicine. He, as is well known, has made a thorough study of the socialistic trends in medicine in the last few years, and the facts which he presents must be given great weight, if the problem is to be met fairly by American physicians.

Fortunately, due to the energy of the weekly news magazine *Time*, a summary of the views for socialized medicine, as brought out by Dr. Sigerist, is published in the issue of January 30, 1939. Briefly, the seven points made in his argument are

(1) State control of medicine is not a radical departure, for more than 60 per cent of all hospital beds in this country are owned and operated by governmental agencies. A large part of the care of patients with tuberculosis, blindness, leprosy and narcotic addiction falls under the direction of physicians paid by the United States Public Health Service.

(2) The opinion is expressed that to finance a system of state medicine in the United States would be neither difficult nor extravagant. A considerable portion of the money now spent in a haphazard and wasteful manner by the people might be saved if a scheme of care at least partly under government control was inaugurated. The indigent, under such a plan, would receive complete medical care without cost, low income groups would be financed through compulsory health insurance, while the higher income groups could take care of their health in any way that they pleased.

(3) It is pointed out that although the argument is often used that salaried doctors lose their incentive to do good work, physicians such as Koch, Pasteur, Gorgas, Reed and Welch were all salaried men. So are the workers in the Mayo Clinic and the Rockefeller Institute for Medical Research and about 15 per cent of the United States doctors working in institutional hospitals.

(4) Socialized medicine would limit the free choice of a physician, but it is pointed out that few have a free choice today. A considerable percentage of the population attend clinics and hospitals without knowing which doctor is to see them. There are also many private clinics operating in part in the same manner.

(5) It is pointed out that socialized medicine would not spoil the personal relation between a patient and a

tainly the fever, the anemia and the leukocytosis are consistent with such a diagnosis. Multiple areas of involvement of the bowel are rather characteristic of lymphoma and though there is no direct evidence of a lesion in the lower intestinal tract the symptoms certainly suggest one.

Is this primary adenocarcinoma of the stomach with metastasis to the liver? Were it such, I would expect the patient to have more definite stomach symptoms, with the accent on anorexia and active nausea rather than lower intestinal symptoms at the onset of the disease. It is an interesting combination of stomach mass and lower intestinal symptomatology. I think some such diffuse disease as lymphoma is the most tenable diagnosis.

DR. TRACY B. MALLORY: Dr. Schatzki, how would you feel about the possibility of the stomach tumor being lymphomatous?

DR. SCHATZKI: I do not think I have ever seen lymphoma produce such a lobulated polypoid type of lesion. If this is tumor it must have a comparatively small attachment and the main mass is polypoid. From my own experience it is very unlikely to be lymphoma. I would from the x-ray appearance clearly rule out lymphoma.

DR. MALLORY: How would you feel about it, Dr. Benedict?

DR. EDWARD B. BENEDICT: I did not see this patient and did not gastroscopically examine him, but I was wondering if he could have had multiple polypoid lesions of the stomach as well as of the colon.

DR. BAKER: The barium enema was negative.

DR. BENEDICT: I cannot make a diagnosis.

#### CLINICAL DIAGNOSIS

Carcinoma of the stomach with metastasis to liver

#### DR. BAKER'S DIAGNOSIS

Lymphoma of stomach, liver and small intestine.

#### ANATOMICAL DIAGNOSES

Polyposis of stomach with malignant degeneration

Metastatic carcinoma to the liver

Icterus

Bilateral healed apical tuberculosis

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: This case is like the preceding one in that the clinical symptoms seem to point to the lower intestinal tract, but the findings are all in the upper intestinal tract. The stomach showed about five polypoid lesions of which one was frankly malignant, two frankly benign and two questionable. The liver was very extensively involved with metastases, weighed 4500 gm and three quarters of that weight was, I am sure, due to metastatic carcinoma. It is quite true that we very rarely see evidence of liver insufficiency with metastatic cancer, but in this case it was present. There was a great deal of necrosis of liver cells around the tumor nodules apparently from pressure or perhaps from interference with the blood supply that may have had something to do with the clinical evidence of liver insufficiency.

A PHYSICIAN: Was the spleen enlarged?

DR. MALLORY: The spleen was normal. The lower intestinal tract was absolutely normal, nothing whatever was found to account for the diarrhea except the stomach and the liver involvement.

## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

POSTPARTUM HEMORRHAGE DUE  
TO A PARTIALLY ADHERENT PLACENTA

Mrs. R. F., a thirty-two-year-old para III, at term, entered the hospital in active labor on November 20, 1937.

The family history was essentially negative, as was the patient's past history. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted four days without pain. Her two previous pregnancies had been normal and resulted in normal deliveries. Her last period was said to be December 25, 1936, making her due for delivery October 1, 1937, but it was assumed that her dates were confused. The present pregnancy had been normal throughout.

Physical examination at entry showed a well-developed and well-nourished woman. Her heart was not enlarged, there were no murmurs. Her lungs were clear and resonant, there were no rales. The blood pressure was 114 systolic, 64 diastolic. The fundus was three fingers below the ensiform, with the vertex in the LOA position and engaged. The fetal heart was heard at the rate of 140 in the left lower quadrant. Her pelvic measurements were normal.

Her labor was short and active, without benefit of any medication. She was delivered normally of a 7 pound, 12 ounce, female child at the end of four hours. One ampule of posterior pituitary extract was administered at the end of the second stage of labor. At this time the pulse rate was 104. The fundus did not react well, the placenta did not separate entirely, and she bled steadily and moderately. She was therefore etherized, and a manual extraction of the placenta was performed without difficulty one hour after the birth of the baby. Following this, the patient went into a state of shock with a pulse of 144. Intravenous glucose was attempted, but the veins were collapsed. A vein was cut down upon, and 2000 cc. of 5 per cent glucose was administered. At the end of this time her blood pressure was 100 systolic, 44 diastolic. The uterus seemed to be in good condition, and it was believed that the patient was out of danger. Additional pituitary ex-

tract and an ampule of Ergotrate had been given before and after the extraction of the placenta.

Within an hour the patient had again lapsed into shock, with a blood pressure of 80 systolic, 56 diastolic, and a pulse at the rate of 168, which was weak and irregular. The fundus was soft and enlarged, and the patient bleeding. Accordingly the uterus and vagina were tightly packed. This effectively controlled the hemorrhage. Another intravenous injection of glucose was given. The pulse rate was 190 and almost impossible to obtain. The blood pressure was 60 systolic, 50 diastolic, and caffeine and Coramine were given. As suitable donors had been procured, a citrate transfusion of 600 cc. of blood was given. The pulse came down to 120 and was regular but thready. An hour after the first transfusion 500 cc. of additional blood was administered. The pulse rate was then 114, the blood pressure 110 systolic, 70 diastolic, and although she was weak and pale, she was out of shock, with a pulse of fair quality and no bleeding.

For the next twenty-four hours, she had a pulse rate of about 140, and the blood pressure was 130 systolic, 60 diastolic. During this time she received 2000 cc. of 10 per cent glucose in distilled water, it was allowed to run in over a period of eight hours. The uterine pack was removed at the end of this time. Her fundus remained firm, and there was no more bleeding. She ran a septic course for a week and was discharged on the twenty-second day. Her red-blood-cell count was 3,750,000 and the hemoglobin 75 per cent on the seventeenth day.

*Comment.* This case of postpartum hemorrhage was due to a partially adherent placenta and emphasizes the need of carefully watching every fundus after the placenta has been delivered, especially one in which postpartum hemorrhage has occurred. It is doubtful whether this fundus was carefully watched after the placenta was removed. It is also possible that the packing of the uterus at the beginning might have prevented the secondary hemorrhage. Intravenous pituitary extract was not used, it might have been valuable.

CHAPTER 112, SECTION 8 OF THE GENERAL  
LAWS OF MASSACHUSETTS

At the request of a fellow of the Massachusetts Medical Society we are reprinting Chapter 112, Section 8, of the General Laws of Massachusetts.

No person shall enter upon, or continue in, the practice of medicine within the commonwealth until he has presented to the clerk of the town where he has, or intends to have, an office or his usual place of business, his certificate of registration as a physician in the commonwealth, or, if it is lost, a certified state

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are invited and will be discussed by members of the section.

physician The fact that a doctor is a member of an organized group does not spoil this relation What really spoils it is that the doctor has to charge a fee and the patient has to pay the bill Once the money question is removed, the relation between physician and patient becomes purely human

(6) Socialized medicine need not lower the standard of medical care There is no reason, as a matter of fact, why care should not be better under group practice, such as is exemplified by the outpatient departments of ordinary hospitals

(7) Finally, there is the question of whether government control would bring politics into medicine It should be pointed out that the United States Public Health Service, one of the most efficient in the world, has always been free from politics It seems reasonable to assume, moreover, that any matter dealing so intimately with the public as the question of their health would develop behind it a strong enough public opinion to overcome meddling by politicians

These are the arguments that are used for socialized medicine Whether such a scheme could actually be put into practice, is another question, of which Dr Sigerist is not unmindful In order to study the condition historically he will ask his students to investigate certain parts of the State of Maryland with the idea of outlining a plan to put into practice socialized medicine, guaranteeing to give to every individual the best possible medical care By methods such as this a question which is vexing the whole medical world may be solved At least if we do not look at the problem from all sides, we are sure to let our judgment be swayed by emotions rather than by our intellect *Time* has done a distinct service to the medical profession in presenting Dr Sigerist's view in a clear-cut and interesting manner It is hoped that its editors, in turn, will interview an exponent of the opposite theories and present the arguments against socialized medicine in a manner of equal impartiality

## THE ADAPTABILITY OF THE HUMAN MIND

In the early years of the depression a nationally known labor leader issued a statement to the effect that if economic security was not speedily restored, chaos would result, men could not stand the pressure of opposing circumstances, their minds would

give way and they would go mad Men's minds did, of course, give way in those days, and men did go mad, just as they have, and will, in every known year and under all conceivable circumstances The mass of men, however, shifted their pace to suit the rate of travel and continued on their way

We adapted ourselves in 1914 and 1915, and particularly in 1917, to the idea of a world war, and did it with surprising alacrity and thoroughness It is useless to go back through history to see how often and under what conditions man has adapted himself to changing environmental influences, history, in our minds, is a dead record of things that cannot happen again

The prewar era, it is true, represented a rather long and rather static period Capitalism and the upper middle classes were firmly entrenched in a pious position of not positively unfriendly domination Labor was allowed a full dinner pail, the country had a fairly good five-cent cigar, and there was nothing to go mad about unless the wrong team won the pennant

What a change was wrought in 1914! First came a world war with a pandemic of disease, then a minor depression, a period of unprecedented prosperity,—and this was the hardest on men's minds,—a great depression, several pseudo recoveries, floods, hurricanes and tidal waves in New England,—of all places,—a shift to the left in our country's politics, again the tread of armed feet over Europe, the British lion with his tail between his legs, a definitely threatened yellow dominancy, and War Admiral again beaten by Sea Biscuit

Dare we predict that if the worst happens,—if socialized medicine strikes at the very tap root of family practice,—if white dominancy and the civilization that started with the Renaissance go down to glory in a blaze of gunfire, when the smoke clears, those of us who are left will be found with our noses pressed against the window-pane, trying to get the latest baseball scores, or lined up before the totalizer to find our winnings when Plum Pudding beats Humble Pie by a length?

'heart attacks or cardiovascular emergencies  
Instructor Edward F Bland Alexander A.  
Levi, *Chairman*

## SUFFOLK

Thursday, March 23, at 4 30 p m., in John Ware Hall,  
Boston Medical Library, 8 Fenway, Boston Sub-  
ject—Cardiovascular Emergencies Instructor  
Paul D White. Reginald Fitz, *Chairman*

case, and derogated *id omne genus* in the epitaph's last  
caustic line.

Here is the inscription

## RUTH SPRAGUE

daughter of Gibson  
& Elizabeth Sprague,  
died Jan 11, 1846, aged  
9 years 4 mo's & 3 days

She was stolen from the grave  
by Roderick R. Clow & dissected  
at Dr P M. Armstrong's office  
in Hoosick N Y from which place  
her mutilated remains were  
obtained & deposited here.

Her body dissected by fiendish Men  
Her bones anatomised,  
Her soul we trust has risen to God,  
Where few Physicians rise.

We hope that there is less truth than poetry in the last line.

Far from these diggings, in Edinburgh, the body-  
snatching industry enriched the language by contributing  
the verb to burke. This word is used more across the  
water than here. In the House of Commons, the Minis-  
ters are often accused of 'burking a bill' in some com-  
mittee.

The following *cause celebre* produced the verb. A  
friendless old army pensioner died in a cheap lodging  
house in Edinburgh. The lodging-house keeper, William  
Hare, sold the unclaimed body without difficulty to Dr  
Robert Knox for 7 pounds, 10 shillings.

This profitable transaction furnished the idea for a new  
cottage industry. William Burke became Hare's accom-  
plice in the hospitable practice of inveigling a series of  
obscure, friendless travelers to the lodging house, where  
they made them drunk. Then they suffocated them  
tenderly, so that there would be no marks of violence.  
The same Dr Knox bought all the proffered bodies at  
factory prices, varying from 8 to 14 pounds. After sixteen  
bodies were delivered to science, the police became sus-  
picious and effective. Hare turned King's evidence, and  
Burke was hanged at Edinburgh, on January 28, 1829.  
An excellent account of the case is given in *Burke and  
Hare* (Edinburgh and London: William Hodge and Com-  
pany, Ltd, 1921).

Soon thereafter, the word *burke* was used to indicate  
any quiet and decorous smotherings, where the *corpus  
delicti* disappeared without trace (*spurio versenkt*).  
Dickens used the word in *Pickwick Papers*.

You don't mean to say he was burked, Sam?

Let us hope that all bad medical bills will be burked in  
committee.

EDWARD F TIMMINS M.D.

527 Broadway,  
South Boston

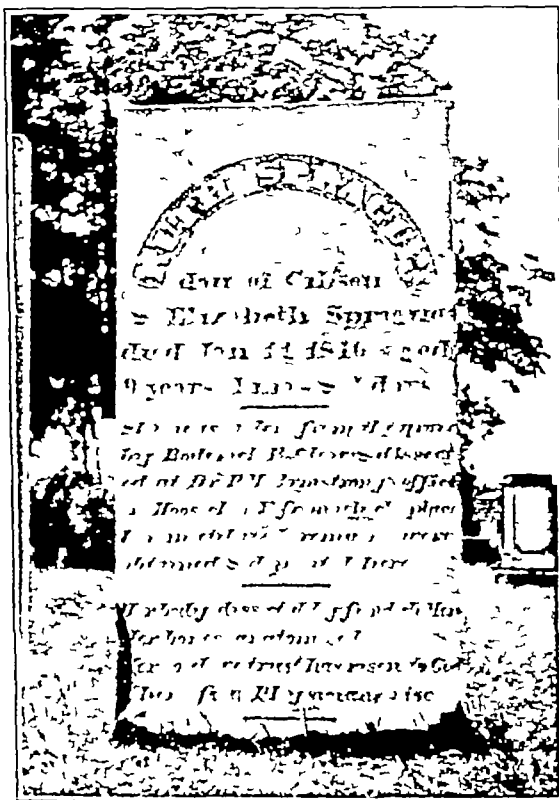
## DR. WILLIAM GAMAGE

*To the Editor* The following account of a remarkable  
man is from S F Batchelder's *Bits of Harvard History*,  
(Cambridge: Harvard University Press, 1924). Under the  
title of *Harvard Hospital Surgeons of 1775* we find the  
following: Dr William Gamage of the class of 1767 was  
the regular Cambridge practitioner. He was an allopath  
of the allopaths.

## CORRESPONDENCE

## BODY-SNATCHING

*To the Editor* In Hoosick Falls, N Y, there is a his-  
toric gravestone with a censorious inscription which  
should interest the readers of Dr Waite's article on the  
body snatching activities of our old time anatomists. Be-



cause of the weathering of the stone, the inscription is less  
distinct than it was when I first saw it, ten years ago.  
Nevertheless, the cold marble has distinctly reprobated  
the overzealous Dr P M. Armstrong for more than a  
hundred and twenty years.

In the case of the Ipswich exhumations, the parish  
meeting appointed a day for the solemn reintering of  
the eight empty coffins in some conspicuous part of the  
graveyard, and voted that a monument be erected over  
them by subscription with the names of the deceased  
whose bodies were stolen inscribed thereon, to perpetuate  
the memory of the horrid deed. But for lack of funds  
no such monument was erected. The outraged parents  
attended to the vindictive publicity in the Hoosick Falls

ment issued by the board, setting forth all the material facts in the original certificate, and a fee of twenty five cents Thereupon the clerk shall record the name of the owner of said certificate or certified statement, together with the date of record, upon blanks approved by the board, said blanks to be so arranged that a duplicate carbon copy shall be made at the time of the original record. He shall keep the original as a part of his official records and it shall be open to public inspection He shall, within twenty four hours after such recording, forward the duplicate to the board Whoever practices or attempts to practice medicine without complying with this section, or whoever submits to a town clerk a false or fraudulent certificate or certified statement, shall be punished by a fine of not less than five nor more than one hundred dollars, and any town clerk who refuses or neglects to comply with this section shall be punished by a fine of not less than five nor more than ten dollars.

## LEGISLATIVE NOTES

### MASSACHUSETTS MEDICAL SOCIETY BALLOT OF MARCH 2, 1939

COUNTED THROUGH MARCH 13 MORNING MAIL

TABLE 1 *Vote on Annual Registration by District Medical Societies*

DISTRICT	FAVOR	OPPOSE	BLANK
Barnstable	18	9	0
Berkshire	50	18	0
Bristol North	18	20	0
Bristol South	64	48	3
Essex North	53	55	4
Essex South	92	51	3
Franklin	10	14	1
Hampden	131	53	2
Hampshire	33	23	0
Middlesex East	13	51	2
Middlesex North	63	27	3
Middlesex South	320	180	5
Norfolk	281	202	5
Norfolk South	32	30	1
Plymouth	69	33	4
Suffolk	303	150	15
Worcester	135	114	8
Worcester North	38	30	0
Out of State	93	30	3
Total	1816	1138	59
			3013

TABLE 2 *Vote on Annual Registration in 11 Largest Communities*

CITIES AND TOWNS	FAVOR	OPPOSE	BLANK	TOTAL
Boston	290	210	17	517
Brookline	165	60	1	226
Newton	120	47	0	167
Worcester	89	74	0	163
Springfield	91	31	1	123
Cambridge	68	27	1	96
Lowell	52	17	1	70
Lawrence	23	26	2	51
Lynn	31	19	1	51
New Bedford	31	18	2	51
Fall River	21	21	1	43

In this table votes were classified as nearly as possible according to residence and not according to district society memberships

TABLE 3 *Vote on Osteopathic Bills*

	FAVOR	OPPOSE	BLANK
H. 985	13	2951	51
H. 986	55	2903	57

## MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 20

### BARNSTABLE

Sunday, March 26, at 4 00 p m., at the Cape Cod Hospital, Hyannis Subject—Gonorrhea Modern treatment of gonorrhea. Instructor Samuel N Vose Donald E Higgins, *Chairman*

### BERKSHIRE

Thursday, March 23, at 4 30 p m., at the House of Mercy Hospital, Pittsfield. Subject—Sepsis. Instructor Joseph W O Connor Melvin H. Walker, Jr, *Chairman*

### BRISTOL NORTH

Thursday, March 23, at 4 00 p m., at the Morton Hospital, Taunton Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor C. Guy Lane Lester E Butler, *Chairman*

### BRISTOL SOUTH (Fall River Section)

Tuesday, March 21, at 4 00 p m., at the Union Hospital, Fall River Subject—Heart Disease. The treatment of 'heart attacks' or 'cardiovascular emergencies' Instructor Ashton Graybiel. Howard P Sawyer, *Chairman*

### FRANKLIN

Wednesday, March 22, at 8 00 p m., at the Franklin County Public Hospital, Greenfield. Subject—Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications. Instructor Edwin H Place. Halbert G Stetson, *Chairman*

### HAMPDEN

Thursday, March 23, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—Gonorrhea Modern treatment of gonorrhea. Instructor Oscar F Cox, Jr George L. Schadt, *Chairman*

### MIDDLESEX EAST

Tuesday, March 21, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Anemia Modern methods in diagnosis and treatment of blood dyscrasias Instructor Clark W Heath. Walter H Flanders, *Chairman*

### MIDDLESEX NORTH

Thursday, March 23, at 4 30 p m., at St. John's Hospital, Lowell Subject—Bright's Disease and Hypertension Evaluation of new therapy diagnosis Instructor W Richard Ohler William S Lawler, *Chairman*

### MIDDLESEX SOUTH

Tuesday, March 21, at 5 00 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Subject—Heart Disease The treatment of



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The next meeting of the New England Heart Association will be held at the Beth Israel Hospital on Monday evening, March 27, at 8 15

## PROGRAM

- The Significance of Variations in the Anatomy of the Coronary Arteries Dr Monroe J Schlesinger  
The Circulatory Effects of Benzedrine and Paredrine and Their Clinical Significance. Dr Mark Altshuler.  
The Incidence of Normal Cardiac Findings Following Acute Rheumatic Fever Dr Morton G Brown  
The Significance of Changes in Blood Volume in Congestive Failure during Stages of Development and Recovery Dr John Waller  
Relation of Arterial Hypertension to Coronary Arteriosclerosis and to Congestive Failure. Dr David Davis  
The Rate of Interchange of Substances between Plasma and Edematous Deposits Dr Dorothy Rourke Giligan.  
A Study of Marked Arteriosclerosis in Patients with and without Angina Pectoris Dr Herrman L. Blumgart.  
Interested physicians and medical students are cordially invited to attend.

EDWARD F BLAND, M.D., *Secretary*

## TUFTS COLLEGE MEDICAL SCHOOL ALUMNI ASSOCIATION

The annual meeting and dinner of the Tufts College Medical School Alumni Association will be held Wednesday evening, March 29, at the Hotel Somerset, Boston.

Changes in the medical school and progress of the medical school campaign will be discussed by President Leonard Carmichael

ALONZO K. PAINE, M.D., *President*

## CAMBRIDGE HOSPITAL

The regular clinicopathological meeting of the staff of the Cambridge Hospital will be held at the hospital, 330 Mt. Auburn Street, Cambridge, on Tuesday, March 21, at 8.30 p m.

Interesting pathological cases will be discussed.

All members of the medical staff are cordially invited

STEPHEN M BIDDLE, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MARCH 20

## MONDAY MARCH 20

- 11.30 a m. Carney Hospital clinical meeting and luncheon  
8 15 p m Boston Medical History Club Boston Medical Library

## TUESDAY MARCH 21

- 9 10 a m Joseph H Pratt Diagnostic Hospital Clinicopathological Conference. Dr Harold Wood. Discussor Dr Howard Sprague.  
\*10 a m 12 30 p m Tumor clinic. Boston Dispensary  
\*12 m South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston.  
8.30 p m Cambridge Hospital Clinicopathological meeting of the staff

## WEDNESDAY MARCH 22

- 9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation. Dr S J Thannhauser  
12 m Clinicopathological conference. Children's Hospital amphitheater

## THURSDAY MARCH 23

- 8.30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Orthopedic.  
\*9-10 a m Joseph H Pratt Diagnostic Hospital Certain Aspects of Toxemias of Pregnancy Dr Lewis Dexter  
3 30 p m Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY MARCH 24

- 9 10 a m Joseph H Pratt Diagnostic Hospital Postoperative Shock and Allied Conditions Dr E. D Churchill  
\*10 a m 12.30 p m. Tumor clinic Boston Dispensary

## SATURDAY MARCH 25

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser  
\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

## SUNDAY MARCH 26

- 4 p m Illustrated public health lecture Faulkner Hospital auditorium Foreign Bodies in the Upper Food and Air Passages Dr Lyman G Richards

Open to the medical profession

MARCH 17—Sir William Osler Honorary Society of the Tufts College Medical School Page 457 issue of March 9

MARCH 19—Health Lecture, Quincy City Hospital Page 363 issue of February 23

MARCH 19—Lecture at the Faulkner Hospital Page 971 issue of December 15

MARCH 19—Free Public Lecture, Harvard Medical School Page 1056 issue of December 29

MARCH 20—Carney Hospital Clinical meeting and luncheon Page 492

MARCH 20—Boston Medical History Club Page 492

MARCH 21—Cambridge Hospital Clinicopathological meeting of the staff Notice above.

MARCH 21—South End Medical Club Page 404 issue of March 2.

MARCH 23—Medical Clinic at the Peter Bent Brigham Hospital Page 492.

MARCH 27—New England Heart Association Notice above.

MARCH 27 31—American College of Physicians Page 36 issue of July 7

MARCH 29—Tufts College Medical School Alumni Association Notice above.

APRIL 13—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill

MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 13-16—American Board of Obstetrics and Gynecology Page 457 issue of March 9

MAY 14 20—American Physicians Art Association Page 404 issue of March 2

MAY 15-19—American Medical Association St. Louis Missouri

MAY 27 23 and 24—American Association for the Study of Gout Page 405 issue of March 2

JUNE 6 7 8—Massachusetts Medical Society Worcester

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22.

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15 28 — Pan Pacific Surgical Association Page 863 issue of November 24

FALL, 1939 — Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

APRIL 5 — Addison Gilbert Hospital Gloucester Clinic at 5 p m  
Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy  
MAY 10 — Annual meeting Salem Country Club Peabody

### NORFOLK DISTRICT

MARCH 28 — Page 493

### SUFFOLK

MARCH 29 — Joint meeting with New England Pediatric Society Boston Medical Library 8 15 p m

APRIL 26 — Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

### WORCESTER

APRIL 12 — Worcester Hahnemann Hospital Supper at 6 30 business and scientific sessions 7 30

MAY 10 — Worcester Country Club — annual meeting

## BOOKS RECEIVED FOR REVIEW

*Chronic Diseases of the Abdomen A diagnostic system* C Jennings Marshall 247 pp Boston Little, Brown & Co, 1939 \$6 00

*Superfluous Hair and Its Removal* A. F. Niemoeller 155 pp New York Harvest House, 1938 \$2 00

*The Complete Guide to Bust Culture* A. F. Niemoeller 160 pp New York Harvest House, 1939 \$3 50

*Surgical Treatment of Hand and Forearm Infections* A. C. J. Brickel 300 pp St. Louis C. V. Mosby Co., 1939 \$7 50

*Health at Fifty* Edited by William H. Robey 299 pp Cambridge Harvard University Press, 1939 \$3 00

*Landmarks in Medicine* Laity lectures of the New York Academy of Medicine. 347 pp New York and London D. Appleton Century Co., 1939 \$2 00

*Elementary Anatomy and Physiology* James Whillis 342 pp Philadelphia Lea & Febiger, 1939 \$3 50

*William B. Wherry Bacteriologist* Martin Fischer 293 pp Springfield, Illinois and Baltimore Charles C. Thomas, 1938 \$4 00

*Clinical Obstetrics* A. Lakshmanaswami Mudaliar 819 pp Edinburgh and London Oliver and Boyd, 1938 27/—

*Whence? Whither? Why? A new philosophy based on the physical sciences* Augusta Gaskell 312 pp New York G. P. Putnam's Sons, 1939 \$2 50

*Everyday Surgery* Lambert Rogers and A. L. d'Abreu 280 pp Baltimore William Wood & Co., 1938 \$4 75

*The Essentials of Modern Surgery* Edited by R. M. Handfield Jones and A. E. Porritt. 1126 pp Baltimore William Wood & Co., 1938 \$9 00

*Surgical Anatomy* C. Laumer Callander Second edition 858 pp Philadelphia and London W. B. Saunders Co., 1939 \$10 00

## BOOK REVIEWS

*Mental Conflicts and Personality* Mandel Sherman. 319 pp New York, London and Toronto Longmans, Green & Co., 1938 \$2 25

Psychiatry is coming to an increasing realization that conflict and anxiety are at the center of all types of mental disturbances and that their dynamic and descriptive evaluation furnishes valuable hints for psychotherapeutic adjustment. This realization has been largely the result of the interpenetration of psychoanalytic concepts into

psychiatry, for it is psychoanalysis which has emphasized that the basis of the neuroses is a conflict between instinctual drives and the defenses erected against them.

The various chapters of this volume discuss the genesis and nature of conflicts—cultural, social, inferiority and sexual—and the interrelations of these to neuroses and antisocial behavior.

While mental conflicts, as a rule, originate in early life, it is doubtful, however, if the child's conflicts are so few and simple as the author claims, as analyses of children have shown that they manifest very complicated reactions toward the family environment. The author justly criticizes the erroneous idea of congenital homosexuality and points out, as has been so frequently observed, that the difference between the normal and the homosexual individual is quantitative rather than qualitative.

Since the volume is essentially psychoanalytic, it appears to the reviewer that the references to the work of Freud are not sufficiently numerous. The most important chapters for the physician are those on the conflicts and the neuroses, and the conflict basis of antisocial behavior. There are detailed discussions on how the neurotic individual unconsciously maintains his symptoms in order to solve his conflicts, that is, that he unconsciously prefers neurotic misery to actual misery as the lesser of two evils and, by so doing, evades the real problems.

The volume is most welcome as an excellent summary of the present status of the psychology of human conflicts.

*Plastic Surgery* Arthur J. Barsky 355 pp Philadelphia and London W. B. Saunders Co., 1938 \$5 75

The author has attempted to present a review of clinical procedures, practiced daily in modern plastic surgery. The method of choice in any group of procedures is generally made clear. Although it should be noted that, in a field as relatively new as this, there is as yet no standardization of methods, hence, methods of choice are always highly personal.

The multiplicity of illustrations and the generally clear and reasonable statement of facts make this book very satisfactory. The material is up to date, and there is a pleasing discretion in the lack of space afforded new procedures which are as yet experimental.

The principles and fundamental theories underlying transplantations are well outlined early in the book. They are clearly presented and an ample bibliography is supplied, just as it is later at the end of each chapter on special topics. The sections on the orbit and nose are particularly good. Similarly it is welcome to find the neck treated in a separate section, since its problems are at times unique.

In conclusion it may be stated that this compact little volume will well repay perusal by anyone interested in the subject of modern esthetic reconstructive surgery.

*Les Ondes Électriques Courtes en Biologie* E. Schliephake. 96 pp Paris Gauthier-Villars, 1938 30 Fr fr

This concise little text presents in a very lucid style the basic principles of short-wave diathermy and its biologic effects. There is included in the volume a considerable amount of the author's original work. He has, furthermore, presented the dynamics of the electrophysics involved in each system and has correlated these findings with their effects on living cells. The work appears to be truly scientific in scope and is a welcome advance in the somewhat confusing field of physical therapy of today.

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## AMERICAN MEDICINE AND THE NATIONAL HEALTH PROGRAM\*

MORRIS FISHBEIN, M.D.†

CHICAGO

I AM quite convinced that there are many in this audience who do not know what the National Health Program includes, but you have, of course, heard a great deal of the attitude of American medicine in relation to many of the new experiments in changing the nature of medical practice which are now being tried in the various parts of the United States, some with and some without the approval of the American Medical Association

The reason for much of the opposition of the American Medical Association to many of these plans is frequently misrepresented, particularly in some of the periodicals devoted to little groups of serious thinkers, publications such as *The Nation Forum*, *The New Republic*, *Daily Worker* and *Liberty*,—I might mention other publications,—but I propose to show you the exact ground on which medicine does oppose some of these experiments and proposes to encourage others

In order to give you a proper background, I shall take you back quite a few years, not to 1883 when Bismarck first promulgated the compulsory insurance law making medicine the tool of the State, nor to England where Lloyd George, in 1912, in order to win an election, offered the people a compulsory insurance system and the dole. Neither shall I take you to the United States during the period of the World War, when Americans became imbued with the necessity of doing everything on a mass basis, without in many instances understanding the personal character of certain service that might thus be involved. I take you, instead, to the year 1932, when the Committee on the Costs of Medical Care tendered two reports on the state of medical practice in the United States. This committee proposed that all medicine in the United States be reorganized on a voluntary insurance basis, with all practice being conducted around the

hospital,—each hospital having a group of physicians and specialists of various types, with the general practitioners in the community acting as feeders for the hospitals,—and that in each state, a central co-ordinating body be organized to control the practice in the individual states. That proposal met with a certain amount of affirmation from some of the social service leaders of the country, but most of the physicians dissented, as did the House of Delegates of the American Medical Association.

You should know, of course, that the House of Delegates of the American Medical Association is a purely democratic body,—probably more democratic than any other organization in this country,—since it derives its membership directly from the membership of the association in each of the individual States. In each county there is a medical society, and that medical society sends delegates to the governing body of the state society, which in turn sends its delegates, proportionate to the number of physicians holding membership, to the House of Delegates of the American Medical Association.

The House of Delegates of the American Medical Association is the only body in the organization which has the authority to establish policies for American medicine. Neither the president of the Association, the secretary, the manager, the editor nor the board of trustees has any right to make a policy for the American Medical Association. All policies derive from the House of Delegates.

There are, in the United States at the present time, 169,000 physicians licensed to practice medicine. Of this number approximately 145,000 are in the practice of medicine, and of the latter, 111,485 are members of the American Medical Association, this is the largest representation in any professional group in the United States or, in fact, anywhere in the world. Moreover, in the past year, we have added to the membership of the American Medical Association at the very time

Presented before the Manchester Medical Society, Manchester, New Hampshire, December 13, 1933.

†Editor, *Journal of the American Medical Association*.

when it was under fire by a great many of the so-called radical publications. The additional 7000 members since June, 1937, constitute the greatest number added annually to our membership in the history of the organization. I mention that particularly because no doubt you have read, from time to time, of a "revolt" in the American Medical Association by a great number of physicians dissatisfied with the policies of the association, and yet at that very time, the addition to the membership was the largest in any single year in our history.

After the reports of the Committee on the Costs of Medical Care and the Commission on Medical Education in 1932, the entire subject seemed to fall, temporarily, in the state, as Grover Cleveland would have said, of innocuous desuetude. There, it lay for a while. Not much appeared in the newspapers about it because the Nation had other serious problems with which to concern itself. It had, in the first place, a national election, which gave the people considerable concern. After the election, there was the great question of recovery. And the most important question that we must still be concerned with is the question of recovery. I should say here and now, as I said at the National Health Conference in Washington, that the problem of medicine must always be a secondary problem, so long as there are 11,000,000 unemployed in the nation. I said, also, that in 1929, 1928 and 1927, we heard little about the inadequacy of medical service and about the lack of medical care. When the vast majority of the people of the country who are capable of working are given work to do with adequate wages for that work,—not the dole that is thrown out for work that is manufactured,—they are in a democratic country, and capable of choosing for themselves how they will live, what they will read, how they will entertain themselves, and who will take care of them in times of sickness.

After the election in 1932 we began hearing about social security, and about great numbers of people who ought to be provided for. We began talking about the Townsend Plan and the care of the aged.

It is interesting that scientific medicine has made many of these problems for the people of the United States. You did not hear about the care of the aged in 1890. In that year, 27 per cent of the people of the United States were over sixty-five years of age. Today 78 per cent are over sixty-five. Today, there are more people over fifty-five years of age than there are under ten years of age, yet, unfortunately, 95 per cent of the people who are over sixty-five are economically de-

pendent. That, of course, is not the fault of the medical profession, that is, obviously, a fault of the economic system. It is interesting, however, that medicine, through prolonging human life and moving it up from a life expectancy of forty years to one of sixty-two years is primarily responsible for giving us the problem of the care of the aged.

In 1900, the average American worker lost twenty-eight days a year from his work because of illness. Today, the average American worker loses but eight days a year. Take 40,000,000 workers and give each worker twenty additional days of work which he would have had to lose and you have 800,000,000 days of work which would have required additional workers. Exactly as the machine age has added to the problem of unemployment, so has improved medical care for the vast majority of American workers added to it.

When we began talking about the Social Security Law, which was passed in 1934 and 1935, we were concerned, primarily, with the care of the aged, with the relief of unemployment and with the problem of medical care. At that time, a conference was called in Washington, with various committees set up to study various aspects of the problem. The President of the United States appointed the Technical Committee on Medical Care to advise him on the question of how medicine should be dealt with, under the Social Security Law. Edgar Sydenstricker who had worked with the Milbank Fund and with the Committee on the Costs of Medical Care, was chairman of this technical committee, and he advised the President that the problem could be solved by a compulsory sickness insurance plan for the entire nation. However, the President of the United States was apparently not satisfied with that answer to the problem.

A special session of the House of Delegates of the American Medical Association held that year stated it would be opposed to compulsory sickness insurance. The President of the United States then chose from a list of forty-eight names, which were presented to him, twelve men whom he constituted as a special committee. This distinguished committee, led by Dr. Harvey Cushing and including the president of the American Medical Association and ten other distinguished physicians, recommended to the President that there be no compulsory sickness insurance in the Social Security Law. It was not in the Social Security Law. Instead, Congress voted \$10,000,000 a year, to be spent by the United States Public Health Service, in grants made to individual states which would apply equal sums from the state treasuries for the expansion of medicine. This money was



to be for infant and maternal welfare, for the improvement of dentistry, for the care of those with heart disease, the crippled, the blind and the hard of hearing, and for the control of venereal diseases and cancer

Dr Thomas Parran brought the venereal diseases prominently into the limelight. As a result, there was introduced in the last Congress of the United States the La Follette-Bulwinkle Bill. This bill gives, I believe, \$3,000,000 this year, \$5,000,000 next year, \$7,000,000 the following year, and up to \$25,000,000 a year thereafter for the expansion of our control of venereal diseases with provisions for Wassermann examinations and for arsphenamine and other valuable drugs to be given to those who are unable to pay, and in general gives this nation a campaign somewhat comparable to what is being done in England. In addition, because one of the important senators died of cancer, the senators pledged themselves to pass a bill for the improvement of our knowledge of cancer to the tune of \$750,000 a year for five years, to be devoted to a building for the study of cancer and the dissemination of funds to various universities throughout the country making a study of the disease.

We have not lagged far behind in our attention to the specific problems of the Nation. But then if there is any other proof that you need of this fact, I should like to point out that when, presumably, one third of the nation is undernourished and poorly housed and without medical and dental care, the Surgeon-General of the United States made public a report that the sickness and death rates of the United States were the lowest in our history, and that they were much lower than the comparable rates of England, France, Germany or any of the other great nations of the world. If we have a problem, it is not an emergency problem of the type indicated by the articles that have prevailed in our press.

At the same time, the problem of medical care is intimately tied with every other problem of the Nation. Medicine is intimately tied with poverty, bad housing and bad social conditions. The correction of bad housing, poverty and bad social conditions frequently brings about a definite improvement in the health of a great majority of the people in any population.

Bear in mind, also, that medicine is tied intimately with our government in many different aspects. From time to time, various federal committees have considered the problem of a reorganization of the government, in order to bring the questions of medical care under one head. For example, the United States government spends today \$125,000,000

a year on various medical activities. This includes the medical departments of the United States Army and Navy, the United States Public Health Service, which is under the Treasury Department, and the care of the veterans, which is in a special department, it includes, also, the care of the insane to some extent, the education of Negroes in matters of health, the Bureau of Mines, the Food and Drug Administration, the Department of Entomology, which is a subdivision of the Department of Agriculture, and studies on nutrition, which are conducted by the Department of Agriculture. It includes one department whose location is apropos, namely that of maternal welfare in the Department of Labor.<sup>1</sup> In addition there is the whole question of health education and health advertising over the radio, which comes before the Federal Communications Commission. There is also the question of truth in medical advertising, which is governed by the rules of the Federal Trade Commission. All these are related to the health of the American people, they are divided into a great number of departments. And there is the Veterans' Administration.

As the result of recommendations by various committees, half a dozen separate bills were introduced to provide for reorganization. The last congress turned down all of them. One of those bills included the creation of a new department, which was to be known as the Department on Social Welfare and Public Works. From time to time, the name of that was changed, so that it became known, eventually, as the Department of Public Welfare. It was to include three divisions: education, relief, welfare or charity, and medicine and the health of the American people. Promptly, education, as represented by all the leading educators of the country, and particularly by the Catholic educators, objected to having education taken out of the Department of the Interior and put under a department that is concerned with charity and relief.

Medicine also put up quite an objection, but not with success. Medicine was supposed to be left under a welfare worker, who was to be a cabinet member, it is no secret now that Mr. Harry Hopkins, who is in charge of the WPA and a considerable number of other welfare activities of the government, was to have been the man to head this department. I mention this particularly for two reasons: it is well known that Mr. Hopkins is close to the President and also that he has been present at most of the sessions of the cabinet in recent years, notwithstanding that he is not one of its members. He is now Secretary of Commerce. Mr. Hopkins has stated repeatedly in writ-

ing that compulsory sickness insurance is the answer to the medical problem of the country. When a committee of physicians, including 430 doctors, recommended that the American Medical Association discontinue all its opposition to the idea that the states go into the practice of medicine, he said "I hail these distinguished physicians who have indicated that they believe—in contrast to the standpat leaders of the American Medical Association—that the state should control the practice of medicine!"

Then we pass to the next period in which there appeared on the scene the American Foundation studies. Just before they were published we began hearing of the Interdepartmental Committee to Co-ordinate Health and Welfare Activities. This committee was headed by Miss Josephine Roche, who resigned as third assistant secretary of the treasury to take over this new position. This body recently sponsored the National Health Conference, out of which came the National Health Program.

When we read about the Interdepartmental Committee to Co-ordinate Health and Welfare Activities, we thought that it was a committee which was going to have in charge the question of getting together all the different medical activities of the United States government under one head, that perhaps they really intended to have a cabinet officer concerned with the health of the people of the United States, a physician in the cabinet, who would know something about the prevention, diagnosis and treatment of disease, and who would be able to consider this problem with other problems that affect the Government. Of course the care of the people's health, from a financial point of view, is just as important a matter for the Government as is the work covered by the departments of justice, commerce and labor and that of many other departments which have smaller budgets.

Not much attention was paid to the Committee to Co-ordinate Health and Welfare Activities, they went right ahead. Then came the American Foundation studies, conceived as a plan to send letters to 10,000 American physicians, asking their opinions about what was wrong with medical practice in the United States. Out of that effort came the Committee of Physicians, headed by Dr. John P. Peters of Yale University School of Medicine, which proposed certain principles and proposals for the reorganization of medicine. While some of their opinions and proposals were excellent, there was one of which I had considerable doubt. That was Proposal 8, which said that the ultimate direction of medical care should be in the hands of

experts, but which did not define who or what the experts were.

When you get on the witness stand as an expert, you have to prove that you are an expert. But under this particular proposal, it was not stated who the experts were to be. The American Medical Association and the profession have long been of the opinion that the only safety for the American people lies in a proposal which says that the investigation, planning and ultimate direction of medical care must be in the hands of the medical profession. We have tried for many years to keep politics out of medicine, and we have done our utmost to keep medicine out of politics. Our chief battle today is to keep politics—Democratic or Republican, Socialist or Communist, or any other kind of politics—and politicians out of the practice of medicine. There is no safety for the people of this country in a system of medical care controlled and developed primarily as a political weapon. Yet that would seem to be definitely the trend into which many of these people are endeavoring to force us.

After the American Foundation made its report in two large volumes there began to be other discussions. A committee went for luncheon with Mrs. Roosevelt and had a meeting with the President. They endeavored to get physicians to sign petitions supporting their ideas.

Those views came before the House of Delegates of the American Medical Association meeting in 1937, and at that time, they were rejected. At the same time a message, signed by all the officers and the Board of Trustees of the American Medical Association, was sent to the President of the United States indicating the willingness of medicine, as represented by 110,000 physicians, to do its utmost to co-operate with the government in giving all the people of this country the best possible medical service that could be given to them. Nevertheless, there was no specific attempt by the President or any of his secretaries or committees to avail themselves of this offer from the American Medical Association.

Then, before the meeting of the American Medical Association in San Francisco in 1938, we began hearing of a National Health Conference, to be called in Washington to consider the problem of providing the American people with suitable treatment of disease and with suitable preventive medicine.

Shortly thereafter, eight of the officials of the American Medical Association received from Miss Josephine Roche, chairman of the Interdepartmental Committee to Co-ordinate Health and Welfare Activities, an invitation to the National Health

Conference We responded by inviting her to come to the meeting of the American Medical Association in San Francisco She was unable to come, but asked Dr Warren Draper, of the United States Public Health Service, to present her views to the House of Delegates He gave those views The House of Delegates heard them with the greatest of interest and then authorized the eight representatives of the American Medical Association who had been invited to attend the National Health Conference in Washington, in July, and instructed these delegates, of whom I was one, to support the policies established by the House of Delegates of the American Medical Association I repeat this again and again to show you that these policies were not made or established or thought out by one person, but represented the collective view of 110,000 physicians, speaking through their delegates in a representative body

So, we went to the National Health Conference, and we had the opportunity to learn, for the first time, about a new concept that is called the National Health Program Apparently, after the President had appointed the Interdepartmental Committee to Co-ordinate Health and Welfare Activities, it set up a Technical Committee on Medical Care, an advisory committee which made a considerable number of studies and, to use the words of the governmental leaders, drew up a blue print to map the progress of medicine for the next ten years I maintain that in times like these it is rather difficult to make a program for medicine for the next ten years Most presidential administrations are for only eight years Five or six years of the present administration have already gone Yet, here we were to have a blue print to map the progress for the next ten years

Miss Roche said, in her opening speech to the National Health Conference, apparently so instructed by the President "Take this program to the representatives of the American people and to the professions most concerned, and present this program to them, so that we may have their reactions to it"

At the National Health Conference we found approximately 250 representatives of various activities of American life There was one activity which was conspicuously absent I mention this because Miss Roche gave a private dinner to representatives of the press on the first evening of the conference I had the pleasure of attending that dinner and sat beside Miss Roche and near to Miss Katherine Lenroot I said to Miss Roche

I see absent from your conference one conspicuous group in the United States "Which one?" she asked I said "This is still a capitalistic country,

and I see no one representing capital in the United States Where is the president of the American Telephone and Telegraph Company? Where are the representatives of the great textile industry? Where are the representatives of the great shoe manufacturing industry? Where are the representatives of the steel industry and of railroads and banks? Where are all these men? Were they not invited?" Her answer was "Yes, they were, but they did not come Some of them sent the industrial physician in the plant" Apparently, capital did not recognize the significance of this National Health Program

There was one man there who was set forth as representing capital I refer to Mr Charles Taussig, president of the American Molasses Company Mr Taussig took it upon himself to speak for capital in the United States, he said he believed that capital would not be frightened by the immensity of this particular program, and would appreciate that it was the means of saving large sums of money for capital Indeed, he said he would endorse it wholeheartedly

All that first day, we heard speeches of various kinds Some of them poked fun at the medical men The doctors were accused as being bloated plutocrats, with trying to exploit the people Dr Hugh Cabot said thousands of young doctors all over the United States were sitting idle in their offices with nothing to do, and asked why somebody did not put the young doctors to work Of course one of the reasons is that people learn by experience, and sometimes a little experience helps a doctor, older doctors know a little more than the younger ones Not always, of course!

Then the next day at the conference we began to hear the National Health Program The National Health Program proposed, for the first time to any group in the United States, an expenditure of \$850,000,000 a year It was said that they did not expect to get it all the first year, but they were working toward it

That sum of money was to be used, first of all, for expanding preventive medicine in the United States Now, I yield to no one, in my wish to expand preventive medicine in the United States, wherever the need can be shown I believe we cannot have too much preventive medicine, based on sound, scientific knowledge But, I am also a believer in telling the people the truth about preventive medicine, as about everything else concerned with science There are many diseases that we could not prevent next year if you gave us \$850,000,000,000 instead of the \$850,000,000 I have just mentioned We could not, with our present knowledge, prevent a single case of infantile paralysis because we have no exact knowledge

of how the disease is spread from one person to another, and of how the disease shows its earliest symptoms. Of course, we have the suggested symptoms of an increased number of cells in the spinal fluid and of fever conditions resembling a common cold, but by the time we recognize even these symptoms, the disease has spread. A mild case frequently appears in a community in which there has not been a recognized case for a year. So I say that even if we had \$850,000,000,000, we could not guarantee to prevent one case of infantile paralysis. Prevention rests on scientific knowledge, and scientific knowledge should precede the expenditure of vast sums of money on all sorts of diseases whose etiology is not established.

It was proposed, also, that there be complete medical care for the indigent, and for a new group to be known as the "medically indigent." There have been all sorts of arguments about the latter term. We all know that one hundred dollars a month to spend in New York City is barely enough to live on and have anything resembling decent living conditions. I should say at once that such a man is medically indigent. It is impossible for him to save up for an appendicitis operation, a gall-bladder operation, a broken leg or a baby. But these emergencies can happen in any family. A man with one hundred dollars a month to live on in New York City is not prepared for such an emergency. He could be rated as one of the "medically indigent." However, he does not represent a vast majority of the people of the United States. A man living on a farm in southern Georgia and earning a hundred dollars a month, would be what his neighbors call a "big shot." He would be a real citizen in that community, and all the Negroes would tip their hats to him. There can be no single classification of medical indigence in the United States, on the basis of income.

In order to give complete care to the indigent, it is proposed to build 500 additional hospitals in the United States, using governmental money for the purpose, it is also proposed to maintain these hospitals for three years with governmental money, until the communities in which the hospitals are built are capable of taking over these hospitals.

It is claimed that there are approximately 1300 counties in the United States without a good general hospital. However, in contrast the American College of Surgeons, the American Hospital Association and the American Medical Association claim there are only 13 counties in the United States that are more than thirty miles removed from an accepted, general hospital. Furthermore, in 8 of these counties, there is a population of only five people or less per square mile. Naturally they cannot support a hospital, they

could not even keep the beds filled with sick people. Where there are not enough people to support a hospital, even if it were fifty miles away from a good general hospital, you probably would not want to build one.

We have in the United States some 6800 hospitals, and approximately 6218 are registered by the American Medical Association. Seven hundred and twenty-nine of these are acceptable as educational institutions for the training of interns. These hospitals have been, for the past five or six years, from 25 to 35 per cent unoccupied. Why build 500 new hospitals, when a quarter to a third of the available space in existing hospitals is at this moment unoccupied?

Obviously, there might be another answer. This unoccupied space might be used for indigent and medically indigent people, with federal funds and state and county funds available for that purpose. This is another point of view that ought to be considered.

Then, again, when the government builds hospitals, it does not build them the way private industry does. As all of you know, most of the sickness today is cared for in non-profit hospitals. These hospitals were built, in most instances, by communities to provide for their needs or by church organizations, such as the various Catholic orders, Protestant groups, and the Jewish Orthodox and Reform groups. The church organizations have always been active in the building of hospitals, since the care of the sick is a fundamental motive in every great religion.

What will become of these hospitals when the Government starts taking over hospitals, subsidizing some institutions instead of others? Incidentally, they are already deciding which hospital in each community will be given federal money. But why should the government throw its favor to one hospital or another hospital, in relation to the needs of the community?

The Government proposes, when it builds, to spend a lot of money. I am going to mention two of its hospital ventures. In Hot Springs, New Mexico, is a hospital, built at a cost of \$2,500,000, with 90 beds for the care of the crippled children of New Mexico. This particular hospital is named after the mother of the Governor of New Mexico. It is a magnificent hospital, as you may well imagine. When I visited there, it was occupied mostly by Mexican children who had been shipped long distances to Hot Springs, a town of 300 people. Only 30 of the hospital occupants were children from New Mexico. There is no orthopedic surgeon in New Mexico capable of doing the surgery, they rent one from Texas. He goes over, driving one hundred and sixty-five miles, to do the neces-



employers pay their share of the social-security tax, they must add it onto the price of their goods, in order to show a reasonable return on their investment, so when the worker buys the goods, he pays that, too. So it all comes out of the worker.

When the government makes a contribution,—bear in mind that it may take a great deal from the rich, but also a great deal from the poor, money spent in taxes is not manufactured money out of the air, it is your money and my money—it is the people's money, the people must have the right to control their own money and expenditures, if we are to remain a democratic nation.

Our chief opposition to compulsory sickness insurance is not so much that it deteriorates the nation. It invariably does that, it has done that in every country in the world where it has been in existence, regardless of what people say. There is no country today which has as high a standard of medical service as prevails in the United States at this moment. Diphtheria control, infant mortality and even maternal care will compare favorably with most of the great nations of the world. Before we change this system, bear in mind that we object to compulsory sickness insurance not only because it degrades the quality of medical service, not only because it enslaves the medical profession of the country,—and it must enslave us,—but because primarily it is the first insidious approach to the breakdown of the democratic system of government. Give anybody the right to interfere thus intimately with the lives of the people, to pay for them the physician, whether or not the physician is selected by the patient, and you have the first step toward totalitarianism. Personally I hate and fear totalitarianism, whether it be under the name of Fascism or Communism. America is the greatest refuge for a free people existing in the world today.

It has been charged that the American Medical Association is a standpat organization, and that it has prevented the people from trying out new forms of medical service. In the United States there are some 300 group-practice clinics, most of them being operated by men who are members of the American Medical Association. There are 300 fraternal and sick-benefit organizations providing cheap medical care for those who want it. There are 2000 industrial medical-service groups. There are 300 universities which give complete medical care, including diagnostic service and treatment to all their students for sums like \$10 or \$12 a year per student. All of these are operated by members of the American Medical Association.

There are hundreds and hundreds of voluntary

insurance plans set up in which the patient receives, in time of his illness, not the services of the doctor, but the cash he put in, in this way he can get the hospital service and the doctor he needs. I maintain that this is not a standpat medical organization. These services were voluntarily developed under the American plan, which keeps the individual as the determiner of his own life.

The American Medical Association has not approved many of the so-called group medical plans because they have not met the standards of the American Medical Association as to their ethical conduct. I maintain that when any group of physicians form themselves into a corporation and send out solicitors from door to door and desk to desk to solicit patients to leave their own doctors, the effort can only lower the quality of medical service in the country. In some of these groups the individual is led to believe that for a certain sum of money he is going to get a complete medical service. But there are extras. They say they will give a blood count, but if you want a sedimentation test or a complement-fixation test,—because you really should have it,—they will give it to you for a little extra. You are only entitled to two chest plates, so if you want serial pictures of the gastrointestinal tract, they will give them to you, but it will cost you extra. They tell you they have used up all the funds available, and charge you extra, after that, it is the corporation that is collecting the funds and not the people. In many of these clinics, it is the hope to make money from the accessories, such as need less supports, needless corsets and all sorts of needless drugs that may be ordered. That is the fault of every one of these systems, the over exploitation of the patients.

When the Group Health Association was established in Washington, it was opposed first of all, because \$40,000 of federal money was used to develop a private corporation. Why should government employees be subsidized by the American government, they ought to pay for medical care out of their wages, exactly the same as anybody else does. Furthermore, when this charge came up in Congress, the committee asked the lawyer for this group whether there were going to be free barbershops and gymnasiums, because, of course, the employees would be better workers if they had these things.

It was pointed out that with the funds available the group could not give a satisfactory medical service. They proposed to charge \$4.00 per month per family, for a complete medical service, including hospitalization. They have since raised the price, as you can read in the current issue of *Survey Graphic*, to \$6.00 per month, they have

added a \$5 00 initiation fee for every man who enters the service, and they have insisted on a complete physical examination of every human being joining the service, because in all these systems there are always patients with chronic ailments who tend to break them down. Enough patients with psoriasis or a mild diabetes, will break down any such system.

Finally, they have eliminated brain surgery and the care of those with tuberculosis and venereal diseases.

Is that a good medical service? We object on the ground that they are not supplying satisfactory medical service to people who think they are going to get it.

Pressure began to be put on the American Medical Association to consent to a great many of these experiments which did not seem to be scientific. This was done in many different ways, one of which was the attempt to indict the American Medical Association with a grand jury in Washington, in order to make the association sign a consent decree. They will not even tell what kind of a consent decree. They said "You write it out and we shall tell you if it is all right." Those indicted did not write it! The House of Delegates, the only body with authority to speak, said to the Board of Trustees of the association, the body that has complete control of the direction and finances "We wish you to oppose this as a blow against scientific medicine, as a blow against the standards of scientific medicine, which have been set up for the benefit of the people, as a blow against the democratic system of government."

The House of Delegates authorized the Board of Trustees to spend every cent possessed by the American Medical Association to carry this even to the courts of last resort, because they conceive this maintenance of a free medical profession as fundamental to the life of the American people and of the American democracy.

At present a conference committee of the House of Delegates of the American Medical Association is meeting with the Interdepartmental Committee to Co-ordinate Health and Welfare Activities, thus far, nothing definite has been concluded. They may yet get together on some of these points of serious disagreement, such as the 500 hospitals, the 500 diagnostic institutions in rural areas and the method of control over the indigent and medically indigent.

If the federal government is to vote vast funds for the medical care of the indigent, the question next arises as to who should have that responsibility.

At present, there are health officers in the individual states and some of the larger individual counties who believe that all this federal money should be turned over to their health departments and that to their departments should be assigned the diagnosis and treatment of disease among the indigent and medically indigent. It is proposed to introduce legislation in connection with this matter in the next Congress, as an amendment to Title 6 of the Social Security Act, to be put under the individual states and, presumably, from them, down to the county health departments.

This is a question which deserves the utmost care and consideration before the American people embark lightly on such a system. As all of you know, there is a great difference of quality and a great amount of inadequacy in many of our state health departments and in many of our county health departments. This is the result of politics being mixed up with these departments far beyond that existing in the welfare divisions and those of public construction. Before we enter upon this sort of thing, we want to know exactly what is to be done. We cannot approve of a nationwide policy of this type, without a great deal of consideration being given to it.

It has been estimated that it will require eight separate and distinct pieces of legislation to make the National Health Program effective, according to the plans set forth. That means that every one of these pieces of legislation must come before the Congress. There have been times in the past when very little time was allowed for hearings. Sometimes, a bill would be brought up in the morning, heard at noontime and passed in the afternoon. If that is to be done with the National Health Program, the people will be committed to something the soundness of which they cannot determine.

Here again, not only the medical profession, but all the people of the country must be alert to what is being done, in order to determine whether or not it is for the good of the American people.

Lastly, I recommend to all of you that you read in the current issue of the *Saturday Evening Post* the article "Rehearsal for State Medicine" by Samuel Lubell and Walter Everett. This article describes the manner in which the Farm Security Administration has been spreading throughout the United States, and now has already established in twenty different states a system of medical practice, largely under state control. The authors make the point that we need no longer argue whether or not we shall have state medicine, or how we shall have it, because in those twenty states, state medicine is here — by what authority, again nobody

knows—because in these states the Farm Security Administration loans money to farmers with which to pay medical bills

However, when you begin hearing of the abuses that have developed in many states under that system, again you will feel that there should be a much more careful study of it and control of it before any state embarks lightly on such a procedure. I have no doubt but that it will give some satisfaction, but in many other places it has worked only to the degradation of the medical profession, to the deterioration of the quality of service and to the encouragement of chiseling of public funds, beyond anything anybody ever thought of in the past

The American public must be aware of these things if they are to fulfill their rights of American citizenship. Being a citizen not only gives you rights and privileges, but it also gives you responsibilities. We have been far too prone in the past to neglect these responsibilities, leaving them to various leaders to look out for us. We must all take an interest in this matter, if we are to protect the rights of the physician, the rights of patients and the advancement of medical science in this country.

It was Abraham Lincoln, who said "A people cannot exist, half-slave and half-free." I tell you no people can exist with a medical profession enslaved to make a politician's holiday.

## MEDICINE AND THE PUBLIC\*

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**I**T HAS become a tradition in America that European experience in matters social, economic, and political has no significance for us. This appears to be part of a boastful, flag-waving attitude, well characterized by the slogan "100 per cent American." It is strangely at variance with the placid assumption—no, almost emphatic insistence—that our government and all its agencies are inherently riddled with corruption. Because of these national traits, the American public and the medical profession have remained uninformed or misinformed about European experiments in the dispensation of medical care and suspicious of attempts to initiate similar experiments in this country. There are large numbers in all walks of medical life who see the evils in our medical services and would welcome some reorganization, but how disordered are their views of the direction changes should take is evident from a perusal of "American Medicine," a compilation of their opinions, published by The American Foundation in 1937.

The general defects in the provisions of medical care here and abroad have been analyzed with the greatest care, the broad directions which remedial measures should take have been explored and tested by experiments. Some of the most significant reports of these investigations and experiments are those of the British Royal Com-

mission on National Health Insurance in 1926, Political and Economic Planning on the British Health Services, the Committee on Scottish Health Services, the Committee on the Costs of Medical Care, our own National Health Survey, and that of the Technical Committee, which was presented at the recent National Health Conference.

Reiteration of the same problems and presentation of the same solutions in all these reports must bring conviction that there are certain defects inherent in the nature of modern medicine which transcend boundaries of time and place. Moreover, because medicine has its roots deeply planted in the natural sciences it offers objective data by which these analyses may be tested and from which surveys and projects may be oriented. This potential objectivity also gives hope that more rapid advances may be made in the provision of medical care than in the provision of other basic necessities, such as shelter, food, and clothing, the approaches to which have not been so clearly defined. At least there seems to be good reason for Dr. Hugh Cabot's impatience, expressed in a speech before the National Health Conference to "get over this survey business and get on with the war."

Since the general aspects of the problem have been so thoroughly described by others, they will be merely sketched in broad lines as a background for a more particular discussion of the interests of the medical profession and of certain points which lend national coloring to the problem in the United States. It is recognized that solutions

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for these problems cannot be found by physicians alone, but only by the integrated efforts of physicians, other professional groups interested in social welfare, and the government. But physicians occupy a peculiar position as the experts who must implement and execute any plans that may be devised.

The National Health Survey estimated that in 1935-36, in the urban populations investigated, forty per cent of persons came from families with annual incomes less than \$1,000, eighty per cent from families with less than \$2,000. Somewhere in this scale a line can be drawn below which persons are quite unable to pay for medical care without sacrificing the bare necessities of life. The exact location of this line must vary with local conditions which influence the cost of living and with fluctuations in the real value of money. Probably at the time of the survey and for the population investigated, \$1,000 would have been a fair approximation, since over half the population with incomes below this were forced to seek public relief sometime in the course of the year. That forty per cent of our people are too needy to pay for their own medical care is a deplorable and, it may be hoped, a transitory condition connected with the depression. But even in the comparatively prosperous year 1929, only twenty per cent of people came from families with incomes greater than \$3,000 and an equal number belonged to families with less than \$1,000. Although these proportions may vary, nothing short of a revolution will abolish gross inequalities of income and the presence of dire economic need. Any intelligent social welfare program predicated on evolutionary development must take this need for granted and can meet its fluctuations by measuring relief in proportion to income.

The methods by which medical care can be provided must be examined. Attention has already been called to the lowest class, which can afford to pay for no medical care. At the opposite end of the scale is another class whose members can pay individually for all the medical care they may require. Between these two extremes lies the great mass of the population, whose ability to meet costs of medical care varies from the barest minimum to total independence. Unless those in the lower brackets are to accept service of inferior quality they must receive some financial assistance. Even those higher in the scale may, at any time, be reduced by catastrophic illness or disability to the level of indigence. Illness is a hazard of such unpredictable incidence that it cannot be budgeted in advance like most of the prime necessities of life. It is more disastrous than other hazards because it imposes a double penalty. It

deprives the wage earner, at least, of income just when it is most needed to meet the costs of medical care. It is to meet the needs of this great middle class that cost-sharing methods have been devised.

Before these methods are considered, however, a more fundamental question must be decided. Is it to the advantage of society to provide for the health needs of the whole population? From a purely humanitarian standpoint the answer would undoubtedly be affirmative, but humanitarianism sometimes has to yield to economics. Whether a comprehensive program against sickness and disability would yield returns commensurate with its costs is harder to answer. It has been estimated that losses through illness are three or more times as great as expenditures on medical care. Undoubtedly, if these expenditures and the care which they purchase were better organized, the losses could be greatly reduced. Dr. Louis I. Dublin, at the National Health Conference, stated: "Studies which have been thoroughly confirmed show that on the score of the nation's assets, human beings are valued in terms of their productive capacity at five times the value of all other assets." And in another passage: "Again and again health departments, insurance companies, private agencies, have proved to the hilt that there is no finer investment than an investment in the prevention of disease and the care of the sick." These predictions are not without factual support, but if they were merely statements of opinion, it is often opinion rather than fact that determines action. At the National Health Conference, there was unanimous admission of the existence in this country of a great unmet need for medical care and clamorous insistence by all organizations of consumers for some action to meet this need. That care must be provided to the truly indigent by the government is more and more generally accepted. Both the public and the medical profession recognize that physicians cannot supply all the service required gratuitously. Private philanthropic efforts are so dependent upon emotional appeals that they can probably never be effectively organized and directed to meet the demands of such a broad social problem. Governmental aid recommends itself also on the score of equity. Voluntary philanthropy puts a penalty on generosity. The physician can bear the burden only by mulcting his rich patients for the sake of the poor. Moreover, the demand for gratuitous services falls heaviest on those who can least afford to give them, practitioners in needy communities. But all these details become insignificant before the one fundamental fact that the truly needy can

receive medical care only by subsidies derived from the pockets of the wealthy, whether they come in the form of taxes or gifts

If the decision is made to provide for the needy, certain inevitable consequences must be faced. Although poverty is not a sign of delinquency, no premium should be put upon it. Those just above the level of absolute need cannot with justice be treated worse than their poorer brethren. Yet this is inevitable if public aid is given only to the truly needy. Those just above the income boundary of indigence must be reduced to the ranks of public charges by illness or disability before they can receive help. To escape this dilemma many will delay or forego medical care not urgently necessary.

It is to enable persons in this middle class to secure medical care that various cost-sharing methods have been devised. Of these, health insurance deserves major consideration because it has been more widely tested than any other procedure and because in theory, at least, it is more exclusively directed to meeting the costs. This latter point cannot be too much emphasized. Insurance is only a method by which people combine to meet collectively a hazard which, for the individual, has a variable and unpredictable incidence. Because methods for the distribution and administration of medical care under health insurance have rather generally followed a conventional pattern, it has been too much assumed that this pattern is implicit in all health insurance systems. If this were the case, the imminence of health insurance under the growing pressure of public demands would be cause for serious anxiety. There can be little doubt, from the experience in Great Britain and other European countries, that the adoption of health insurance, conventionally patterned, would improve the health of the people at large and the economic status of the physician. The imposition of such a uniform system, however, especially if it gave momentary satisfaction, might ultimately delay progress by checking experimentation. Errors in the present health insurance systems have been discerned and should not be repeated in this country. Some of the chief errors arise, I think, from uniformity in the methods of administering medical care.

If insurance is to cover all those to whom it is applicable it must be compulsory, voluntary health insurance can never provide for the population as a whole. It will assure individuals in any income stratum better care than they could otherwise afford, but it does not abolish the income strata. Consequently, it continues with only slight modification the present order in which care is proportioned to wealth. If the system is to be supported entirely by the insured on

the contributory principle, the same difficulty is encountered. Those in the lowest income brackets can buy only an inferior grade of medicine. The higher standards of care are set, the more limited becomes the class which insurance can cover and the larger grows the group which must receive public support. Employers' contributions are more adapted to provide disability benefits than to purchase medical care, because they can be levied only for the benefit of wage earners to the neglect of the unemployed and dependent members of the population. If a high quality of medical care is to be provided to the whole of the otherwise self-supporting middle class, the premiums of those in the lower income brackets must be supplemented by the government.

Evidently insurance must be scrutinized with some care. If improvement of the health of all the people is the goal, the rich will have to contribute through taxes to provide subsidies for the needy. If the problems of the intermediate class are to be solved by health insurance, premiums must be graduated according to income and must be supplemented by government contributions graduated in the reverse direction. If such a system is subjected to analysis, it at once becomes apparent that insurance is no more than a special form of taxation imposed upon a certain portion of the population. It may have certain advantages over a wholly tax-supported system, but these advantages have not the same weight under all conditions. The recommendations of a large minority of the Scottish Commission are worth quoting in this respect. "The insurance principle becomes continuously less appropriate as the field covered is widened. It has pre-eminent merits as a device for raising money for purposes that are sectional, but when the whole, or substantially the whole, of the population are potential beneficiaries, the retention of the insurance system means the retention of a considerable amount of machinery to achieve an end that might be compassed more simply."

A final element in the question concerns the components of medical care. It is this dimension of the problem with which physicians are chiefly concerned and in which their expert services are indispensable. Methods of financing medical care are primarily the responsibility of economists. The public-spirited and liberal members of the medical profession are solicitous only that sufficient resources be made available without detrimental restrictions. The American Medical Association has expressed itself rather unfelicitously in this connection. The ten official principles of the Association, intended to preserve freedom of action and initiative to its members, place major emphasis on the maintenance of financial com-

petition and the direct passage of fees from patient to physician. This unfortunate attitude will probably prove transitory. It is quite similar to that which the American Medical Association adopted at first towards workmen's compensation and which the British Medical Association initially took towards national health insurance. Both have found their anticipatory fears unwarranted and have learned that remuneration by the government or other intermediary agencies is quite as useful and more dependable than direct compensation from patients. Unhappily these temporary misapprehensions divert attention from the more important subject, the nature and quality of medical care.

The very minimum of medical services is the provision of public health measures. In the beginning, these included only measures to eliminate environmental factors conducive to ill health or physical disability and to prevent the dissemination of contagious diseases, together with the custodial care of the mentally deficient and insane. More recently the care of certain chronic diseases, notably tuberculosis, has been entrusted to the government. Public health departments in certain communities are now engaged in providing diagnostic and therapeutic facilities for physicians, in the rehabilitation of crippled children, in reducing the hazards of maternity and improving the medical care of infants, and in preventing or eliminating industrial hazards. Although the assumption of many of these functions by governmental agencies was contested by the medical profession, at the present time the need for their further expansion under the same auspices is quite generally accepted. Efforts should be made to bring public health services throughout the country up to the high standards which now obtain in only a small part of the nation, and to integrate them more closely with the medical services.

Without sickness or disability benefits as a provision against the economic distress that comes from illness, medical care for the needy or near needy becomes almost an empty gesture. This, private philanthropy has but ill provided and the medical profession cannot give. It is logical to believe that unemployment insurance will soon be stretched to cover it. There is no good reason why unemployment through illness or disability should be distinguished from unemployment incurred for other reasons. Sickness benefits, although they are necessary adjuncts to any comprehensive program for the conservation of health, are not directly medical, but economic measures. Their costs should not be confused with those for medical care, nor should the burden for their administration fall upon physicians. The latter will

undoubtedly have to participate in the process of certifying disability, but their duties in this respect should be minimal lest they be diverted from the more important functions which they alone can serve.

Although the general practitioner is and must remain the fundamental unit in any medical system, the mere distribution of medical attention, exposure of patients to physicians, cannot be interpreted as the provision of adequate care. It is the greatest weakness of national health insurance systems that this has hitherto been almost their sole objective. Undoubtedly they have bettered the general health of the people somewhat by bringing more persons into contact with physicians. In this day, however, a practitioner with only stethoscope and prescription pad can offer but a small part of the benefits which medicine has to contribute. Like every pursuit which is founded on science, medicine has undergone a technological revolution. Today, the scientific practice of medicine demands knowledge, expert technical training, diagnostic and therapeutic facilities undreamed of ten years ago, the armamentarium which it will require in another ten years is beyond prediction. If the world is to reap the benefits of these scientific discoveries, they must be made available to the public.

It is hard to see how this can be efficiently accomplished without some departure from the present individualistic system of practice. No one man could acquire the knowledge and technical proficiency to practice all the skills of medicine, even if he had the money to possess and the time to manipulate all the apparatus. The general practitioner is to be congratulated if he can keep aware of new developments and recognize the indications for their use. Specialization, especially in the use of technical procedures, has become essential. However, specialties should not be practiced for their own sake, they are merely ancillary to the broader functions of medicine and must be co-ordinated by some method. Co-ordination is essential for another reason. The physical equipment required for the modern practice of medicine is so costly that it becomes ever more important that it be utilized with the greatest efficiency. The overhead expense incurred in the purchase, maintenance and operation of this apparatus, which makes up no small part of the cost of specialist services, becomes unduly large under an individualistic competitive system because of the reduplication of equipment that such a system entails. It is almost too obvious to mention that under even the most efficient system, with these accessories and with the greater educational preparation which is demand-

ed of physicians, doctors can no longer afford to give medical care gratuitously to the increasing proportion of the population that cannot afford to purchase it

In spite of the apparently inevitable implications of medical evolution, efforts at co-ordination are still in the most elementary stage. Physicians trained in various specialties have formed private groups which can offer more comprehensive service than any individual in the group could give alone. The economies effected by such voluntary aggregations, even if its members are activated by the highest motives, under a competitive system with fees more or less standardized, accrue to the physicians rather than to the patients. The formation of groups or co-operative organizations which provide general care on a prepayment basis, although in theory it would seem a sound procedure, has met the bitterest opposition of organized medicine. The reasons advanced to explain this opposition seem to the initiated not altogether consistent nor convincing. It is claimed that it will destroy the professional status of the physician, as if medicine were still comparable to the law, a pursuit that can be conducted without special properties or technical aids. There are strong objections to the exploitation of physicians and patients for profit and to the control of groups by organizations or persons with interests foreign to those of the patient. Fear of such dangers and fear lest the element of personal responsibility be removed from the physician justify injunctions against the corporate practice of medicine. Advertising and soliciting patients are likely to have a degrading influence. Experiments have proved, however, that these dangers and nuisances can be avoided in co-operative enterprises instituted to furnish medical care to organized groups of the population, so long as no third party is permitted to profit from the undertaking. If insistence that each patient have the right to free choice of a physician expresses more than a desire to preserve unrestricted competition among physicians, no one can dispute the remark made by Dr C. E. A. Winslow before the National Health Conference: "I have great sympathy with the principle of freedom of choice of physicians, but I should like to point out that any acceptable definition of freedom of choice of physicians must include the right of a group of patients to choose a group of physicians of their choice. Any artificial attempts to interfere with that freedom cannot stand." The following passage from the latest official resolution of the American Medical Association concerning hospital insurance is at best an inept manner of conveying the idea that the sacred personal relation between patient and

physician must be preserved. "If for any reason it is found desirable or necessary to include special medical services such as anesthesia, radiology, pathology or medical services provided by out-patient departments, these services may be included only on the condition that specified cash payments be made by the hospitalization organization directly to the subscribers for the cost of the service." My respect for American physicians will not allow me to admit that their services will be influenced predominantly by the hands through which they receive their compensation. But the emphasis in their resolutions and in the statements of their official spokesmen has been unfortunately placed. Equally unfelicitous is the insinuation that if salaries are substituted for fees the quality of medical service will deteriorate. Such an insinuation is not even entirely ingenuous. For generations young men have served on salaries without objection as assistants to their professional elders. Specialists employ assistants on salary without criticism. Our public hospitals and universities present, among their salaried physicians, examples of unsurpassed industry and enthusiasm.

The great scientific achievements of America and the high standards of its medical schools are cited as reasons for eschewing change in the present methods of medical practice, as if the two were related. How much credit for the rapid advances in investigation and education should redound to the general organization of medicine is debatable, that the tempo of these advances would have been retarded, had there been less co-operative activity, cannot be questioned. Nor can there be any doubt that the association of specialists, often on salary, in our teaching hospitals has greatly accelerated the elucidation of clinical problems. The exemplary nature of the clinical work done in such institutions and by similar groups less intimately connected with universities—such as the Mayo Clinic—has won them international recognition. Is it not the height of paradox to obstruct wider dissemination of the group system when our medical schools are teaching and demonstrating its practical advantages?

Co-operative and group health systems are steadily increasing in numbers and strength. Their extension was recommended by the majority of the Committee on the Costs of Medical Care. They seem peculiarly adapted to meet the requirements of certain portions of the population and certain geographical areas. There is no reason to believe that the group principle could not function under an insurance system or one that was financed by taxation. A movement so obviously conducive to efficiency and economy will not be checked by mere obstructive tactics. It would ap-

pear to be better policy for the medical profession to anticipate inevitable trends. If they participate in experimentation they may influence its direction. If the standards of medical service and the personnel of co-operative ventures were not satisfactory—which has not been demonstrated—some blame would attach to the medical societies which have discouraged or prohibited their members from entering such ventures. If co-operatives encroach upon established practice, practitioners will not better their position by abstaining from participation. If they reduce some incomes, they may increase the general level of income and offer greater security. If, by promoting efficiency, they increase the capacity of physicians to care for patients, they also increase the capacity of patients to pay for these services and enlarge the demand for services. Individual choice of physician may be conserved so far as it is compatible with the best service. Finally, the union of a group of men in a common enterprise furthers education through mutual stimulation and criticism. The best patterns for such enterprises undoubtedly remain to be found, no single pattern is likely to prove suitable for all communities. But the general principle that a higher quality of medicine can be provided by a group of physicians with individually differentiated training and functions, working in co-ordination, than by individual physicians operating competitively, has sound theoretical and practical support.

Hospitals must be included in the medical services that are contemplated and must be made generally accessible. A recent spot map showing a hospital within thirty miles of every person outside of the uninhabitable portions of the Rockies is quite meaningless. It is clear from the report of the Technical Committee, eloquently confirmed by numerous speakers at the National Health Conference, that there are not sufficient hospitals accessible to the members of communities about them, equipped and staffed to provide care of high quality. Construction of further hospitals alone will not meet the need, those already in existence, both public and private, must be improved and made more available. The services of modern hospitals are not confined to their inmates. They provide, in addition, diagnostic and therapeutic facilities to their out-patients and for the patients of physicians in the communities in which they are located.

Finally, no program for the improvement of medical care can neglect education and investigation, the institutions which train the professional personnel and develop newer and more efficient methods to prevent and combat disease. Support for these institutions must be measured out with

no niggardly hand to meet the demand for more and finer products. And the process of education must not stop at the exit from the school. Under a purely competitive economy, the obligation of the medical schools to meet the demand for "refresher" courses for practitioners out of their present meager means and by adding burdens to their already overtaxed faculties is questionable. If they are to satisfy this obligation under any system, further resources must be found. This burden will be partly removed by the formation of properly constituted groups and medical centers and adequate provision of hospitals. A modern hospital or clinic, properly staffed, equipped, and conducted, has all the potentialities of an educational institution. Moreover, the efficient organization of work should grant the workers more opportunity and incentive for self-improvement without impairing accomplishment. It is to be anticipated also that those gifted with curiosity and originality will devote some of this time to investigations that will further speed the advance of medicine.

Means must be found by which personnel and facilities may be selected on the basis of competence and quality, standards, not on stereotyped models, must be established, authoritative bodies, which can exercise judicial powers without fear of political pressure from within or without the medical profession, must be constituted. Although professional or trade organizations have been found inherently unfitted to assume such functions, the medical organization, if it would rid itself of a jealously defensive attitude, could do much to forward discovery of a proper formula.

At present federal, state, county, and city governments all share the load of public health services. No one of them can be eliminated. There is reason to believe that the part that all will play in the provision of medical care will increase. If this is so, the allocation of responsibility is a matter for intelligent consideration, not one that should be predetermined by political ballyhoo or unreasoning prejudice. It is feared that intrusion of government in medical affairs will necessarily bring bureaucracy, regimentation, corruption, and inefficiency. Federal intrusion is particularly feared because of its potential magnitude. Those who admit the necessity for federal financial aid prefer that administrative control be left to the states and counties. Although local autonomy seems to offer more chance for intelligent variation by constituting units of manageable proportions, our experience with social security gives little reason to believe that political inefficiency and corruption will be eliminated by entrusting administration

to local governments. If federal funds are to be spent, the federal government must reserve some right to condition the manner in which they are expended. All these anticipations would be robbed of some of their menace if those with expert knowledge, especially physicians, would enter wholeheartedly into the projection of plans, instead of confining themselves to objections.

Certain virtues our federal government has displayed a great interest in social and economic problems and a capacity to probe them by investigation. There is not space to discuss in detail the National Health Survey, the Report of the Technical Committee, nor the comprehensive program for the improvement of medical care presented before the National Health Conference, but certain characteristics of this program must be stressed. Now that attention is no longer focused on the details that aroused personal and factional animosities at the Conference, it is seen that the program bears the marks of statesmanship, rising above political expediency. The problem is clearly defined and measures for the treatment of each major phase are outlined. The federal government is not given undue predominance, administration is entrusted to local and state authorities, proposals are stated in general terms only, the means to implement them and the machinery to execute them are wisely consigned to further discussion and experiment, gradual, evolutionary develop-

ment is contemplated. Provision of some kind is made for each of the components of medical care, with proposals for financing them in accordance with the economic status of the population. Undoubtedly, objections can be raised to details of the plan, but it provides a basis for discussion hitherto unequaled. Consumer groups have almost unanimously accepted its chief provisions, hailing especially those that deal with means of providing care to the middle class on cost-sharing principles. On the other hand, it is just these proposals that the American Medical Association officially refuses to accept. It admits in principle the necessity for all the others. It even acknowledges the desirability of cash benefits for disability due to sickness. A certain amount of experimentation with voluntary insurance, carefully conditioned, it is willing to countenance. But compulsory health insurance or other comprehensive programs to meet the needs of the marginal income class are excluded from consideration. Such a division between laymen and physicians can have only deplorable results. The temper of the public will not brook complete inaction. Will organized medicine, by offering co-operation, aid in the development of an intelligent comprehensive plan for the provision of medical care, or will it wait until some system is imposed upon the country with defects that can be removed only by years of further effort?

## A SURGICAL APPROACH FOR LIGATION OF A PATENT DUCTUS ARTERIOSUS\*

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BOSTON

THE last three decades have brought forth outstanding achievements in cardiac surgery. Beginning with the first successful suture of a human myocardium by Rehn<sup>12</sup> in 1896, this branch of traumatic surgery was further developed by Beck,<sup>2</sup> Elkin<sup>9</sup> and Bigger,<sup>5</sup> who contributed greatly to the repair of wounds of the heart inflicted by gunshot or stabbing. The early work of Schmieden<sup>14, 15</sup> and the later advances of Rehn<sup>13</sup> and Churchill<sup>6</sup> have placed the relief of constrictive pericarditis on a practical basis which is now productive of highly successful results. Cutler's<sup>7</sup> pioneer operations on stenosed mitral valves have given a new impetus to the designing of procedures for direct attack on cardiac lesions. More recently

Beck<sup>3, 4</sup> and Davies, Mansell and O'Shaughnessy<sup>8</sup> have been able to establish an accessory blood supply to the myocardium in patients with coronary sclerosis or occlusion. However, the exploitation of congenital defects of the heart has thus far been limited to the cardiac envelope. In this field Ladd<sup>11</sup> has successfully repaired a diaphragmatic hernia associated with absent pericardium in which there was herniation of intestines into the thoracic cage around the heart. It now appears that another congenital abnormality, namely a patent ductus arteriosus, might well be brought to the surgeon's attention, for it is probable that the closure of this persisting and anomalous vessel would be a worthwhile undertaking. This paper presents a method whereby the ligation of a patent ductus may be accomplished.

Many of those born with a patent ductus live

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for fifty, sixty or more years without any serious impairment of health, and complain of little more than moderate dyspnea after physical exertion. However, such a span of life is not allotted to all these patients, for the statistics of Abbott<sup>1</sup> show that in a series of 92 autopsied subjects who had this lesion (and who had no other associated anomaly) the average age of death was twenty-four. Twenty-one of these patients died of subacute bacterial endarteritis of the pulmonary artery, 24 died of slow cardiac decompensation, and 16 died of sudden cardiac failure. These figures indicate that

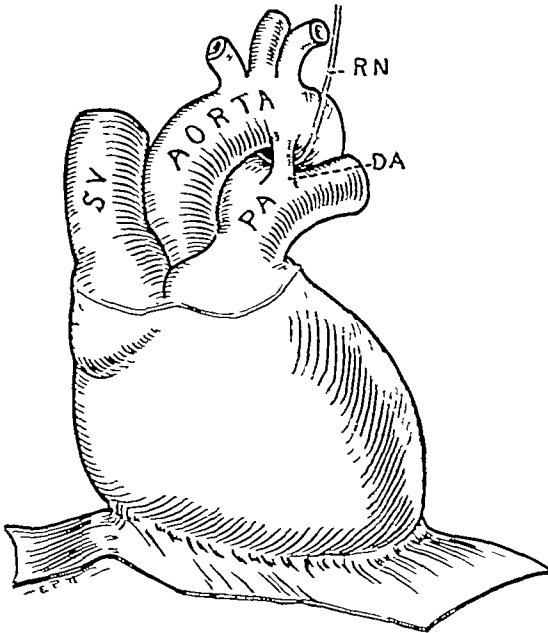


FIGURE 1 Sketch of Heart and Great Vessels Showing Position of the Ductus Arteriosus in Man

*The aortic end of the ductus lies opposite the origin of the left subclavian artery. The pulmonic end of the ductus opens far back on the pulmonic artery near the origin of the left pulmonic artery. In some instances the ductus communicates with the left pulmonic artery proper rather than with the main trunk. The left recurrent nerve curves around the aortic arch passing posterior to the ductus. D.A., ductus arteriosus. R.N., recurrent nerve. SV., superior vena cava.*

the child or adolescent person who has a patent ductus has about a 66 per cent chance of dying prematurely because of the presence of this anomalous vessel and the complications to which it may lead. Therefore, surgical procedures which are designed to obliterate the ductus could carry a very high mortality and still offer the patient a better prognosis than if his lesion were left untreated. It is reasonable to believe that an experienced operator could explore the ductus and ligate it with a mortality rate of 10 per cent or less.

One might argue that there are obstacles which militate against surgical obliteration of a patent ductus. For example, there may be some associated anomaly such as coarctation of the aorta proximal to the aortic opening of the ductus, or congenital stenosis of the pulmonic valve. In either case the persistence of the ductus probably represents a compensatory mechanism and surgical closure would be a fatal procedure, or at least would further embarrass an impaired circulatory apparatus. In the series of 242 cases of patent ductus reviewed by Abbott 150 cases showed associated anomalies of importance but the more serious ones usually led to death in the early weeks or months of life. Thus, if surgical intervention for ligating patent ductus is deferred until children are six or seven years old, the more complicated cases are ipso facto weeded out. Even then it is necessary to exercise close judgment in the selection of cases for operation, in order to select the individual who has a patent ductus and yet has no other serious abnormality.

The objection might be raised that surgical closure of a ductus is undesirable because the persistence of the passageway is prima-facie evidence that it is needed and would have closed off spontaneously if it had not been. The answers to this objection are twofold: first, there are many case reports with careful autopsy examinations appearing in the literature which show that the ductus can persist as a solitary lesion; secondly, if for any reason the ductus has failed to close in the early weeks of life, subsequent closure by natural processes is more difficult, because the vessel gradually becomes so dilated that its walls do not fall together and coalesce so easily as they do in the newborn.

With these considerations in mind, it seemed well to seek a way in which the ductus could be approached and ligated without undue risk. The first efforts to explore the possible routes were made on human postmortem material. The classic mediastinal approach was made anteriorly, portions of the second, third and fourth ribs on the left were removed and adjacent portions of the sternum were rongeuured away, employing much the same exposure as that used for removing emboli from the pulmonary artery. However, it soon became apparent that this exposure was unsatisfactory because the bony orifice of the wound (in children) was too small unless a very extensive and time-consuming removal of most of the sternum was undertaken. Furthermore, the position of the ductus in some cases was so posterior on the aortic arch and the pulmonic artery that with the anterior approach the operator would be work-

ing in the apex of a deep wound, where it would be difficult to avoid injury to the recurrent laryngeal nerve, and where it would be hard to control any bleeding which might occur

Subsequent investigation led me to the belief that the ductus could be more easily approached via the left pleural cavity (Fig 2) With this

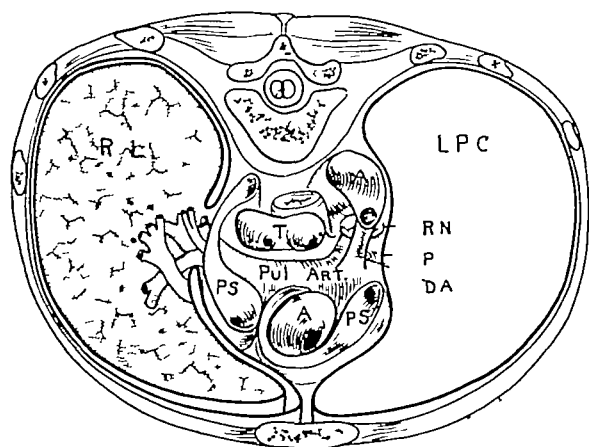


FIGURE 2 Sketch of Horizontal Section through Human Thorax at Level of Fifth Vertebral Body Showing Relations of Aorta Pulmonic Artery Ductus Arteriosus and the Left Pleural Cavity

The left pleural cavity is shown as being empty, for if the left lung is allowed to collapse by opening the pleural cavity the lung falls downward below this horizontal plane. Surgical attack on the ductus can then be readily made through the left pleural cavity merely by incising the parietal pleura which covers the mediastinum in this region. After the ductus is ligated, the left lung can be re-expanded and the chest wall closed. A, ascending and descending aorta; D.A., ductus arteriosus; LPC, left pleural cavity; P, parietal pleura covering the mediastinum above the lung root; PS, pericardial sac; PUL ART, pulmonary artery; R.L., right lung; T, trachea at its bifurcation.

route through the lateral side of the chest, the lung can be allowed to collapse temporarily. The pleura on the mediastinal surface of the pleural cavity can then be incised and a direct and excellent view of the aortic arch, the pulmonary artery and the ductus can be obtained. The exposure by this approach is excellent, and is adequate to control any emergency which may arise, such as bleeding from some small neighboring vessel. After ligation or division of the ductus has been effected, the lung can be expanded with positive pressure through an intubating tracheal catheter and the thoracic cage can be closed.

The feasibility of such a proposal was demonstrated on dogs. After reviewing the local anatomic relation on several canine cadavers, the operative steps were performed on twenty living mongrel dogs. Intravenous Nembutal anesthesia (35

mg per kilogram of body weight) was employed in each case, and an intratracheal catheter was connected with an Erlanger positive pressure apparatus, so that the latter would be available after the thorax was opened. With the left anterolateral aspect of the dog's chest upward, and the left fore leg pulled up over the head, incision was made over the third intercostal space from the sternum to the left midaxillary line. Incision was carried through the lower portions of the pectoral muscles and through the intercostal muscles to gain entrance to the chest. The third and fourth ribs were now cut through at their respective costochondral junctions so that the ribs might be spread widely apart with a self-retaining retractor. A moist gauze sponge was then laid over the lung, which collapsed into the inferior part of the pleural cavity, thus affording an excellent view of the mediastinum in its left lateral aspect. The pleural covering of the mediastinum was incised longitudinally and the ligamentum arteriosum (the obliterated remnants of the ductus of Botalli) was freed around its circumference so that it could be doubly clamped, divided and tied. The left recurrent laryngeal nerve could be identified as it coursed around the arch posterior to the ligamentum arteriosum, and this nerve could be left undisturbed during the manipulations. The thorax was now closed by bringing together the intercostal muscles—expanding the lung with positive pressure before tightening up the last stitch. The repair of the chest wall was completed by suturing the divided muscles and skin.

In no case was a patent ductus found in a dog. However, the rehearsal of the operative steps in this fashion amply demonstrated that an excellent view of the ductus region could be obtained by this route, that the areolar tissues between the aortic arch and the pulmonary artery could be safely dissected in spite of the rhythmical beating of these vessels and the respiratory motions of the thorax, that the collapse of the lung causes no immediate or subsequent embarrassment if the lung was re-expanded at the end of the operation, and that this procedure gave no operative mortality in dogs.

The success of the above exposures on dogs appeared to be substantiated by practicing the operative steps on a number of cadavers of children varying from three months to twelve years of age. Incision through the left third intercostal space from the sternum around to the midaxillary line places the wound at about the optimum level for viewing the aortic arch from the side. Division of the rib above this incision at its costochondral junction and insertion of a self-retaining rib spreader greatly increases the size of the wound.



To approach this portion of the third intercostal space, the skin incision can be made directly over the area in the male, but in the female it is better for cosmetic reasons to make a much lower cutaneous opening—cutting well below the breast tissue, and then turning upward a flap of skin and

covering of the mediastinum between these four structures brings one immediately down on the ductus arteriosus. It is best to incise this pleural covering in a cephalocaudal direction, rather than transversely, for this involves less danger of severing the recurrent laryngeal nerve and the cardiac

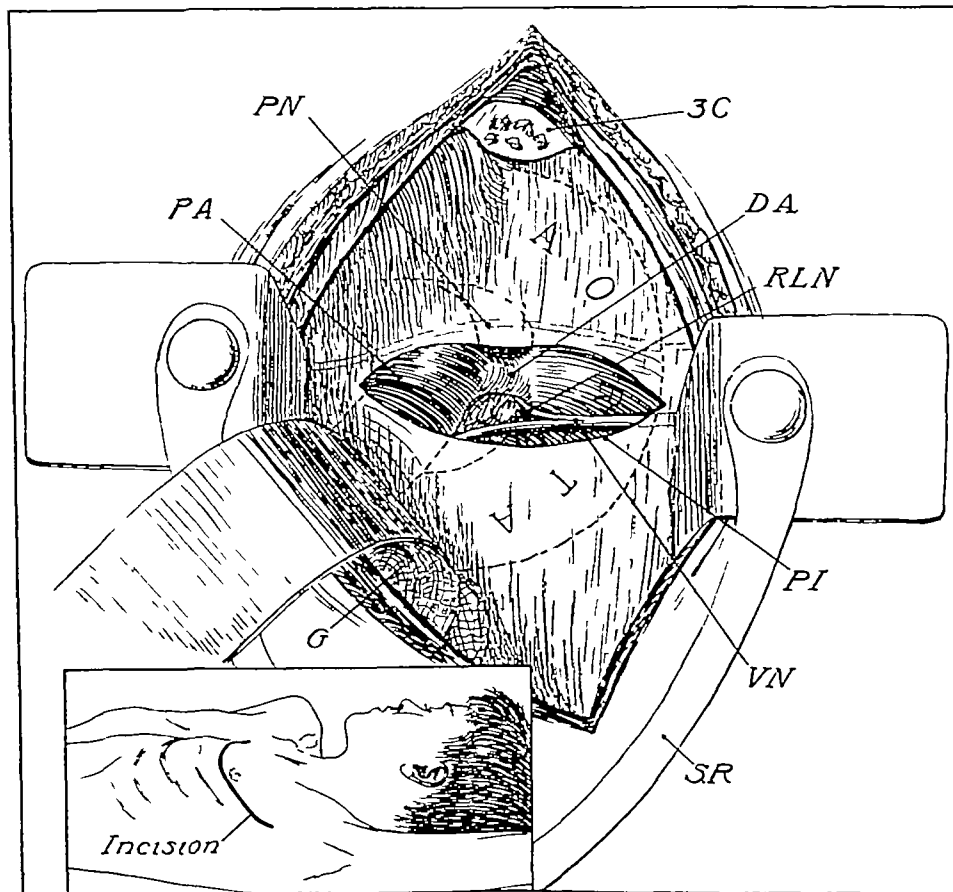


FIGURE 3 Sketch Showing View of the Human Mediastinum as Seen at Operation by an Anterolateral Approach through the Left Pleural Cavity

Incision is made through the third interspace. The third costal cartilage is cut and the third rib is retracted upward. The lung is held down in the bottom of the pleural cavity with a ribbon retractor. The pleural covering of the mediastinum is incised, and the ductus arteriosus is adequately exposed between the aorta and pulmonary artery. 3C., cut end of third costal cartilage. DA, ductus arteriosus. G, gauze pack over compressed lung. P.A., pulmonary artery. PI, pleural incision. PN, phrenic nerve. RLN, recurrent laryngeal nerve. S.R., self-retaining retractor. VN, vagus nerve. The insert shows the position of the skin incision.

muscle until the third intercostal space is reached.

When the parietal pleura is opened the lung collapses and is packed away in the middle and inferior portions of the pleural cavity with moist sponges, this permits a wide view of the mediastinum above the level of the lung hilum. Excellent landmarks (Fig 3) to the desired ductus area are the aortic arch above, the left pulmonary artery below, the phrenic nerve anteriorly and the vagus nerve posteriorly. Incision of the pleural

fibers from the vagus nerve. For a similar reason, it is best to keep this incision somewhat anteriorly toward the phrenic nerve and peel the pleura backward, allowing it to carry with it any small cardiac fibers which are adherent to its surface but too small to be seen. In the great majority of cases the region between the aortic arch and pulmonary artery can be exposed without opening the pericardial sac, but in a few of the cadaver specimens the pericardium had a very high reflection

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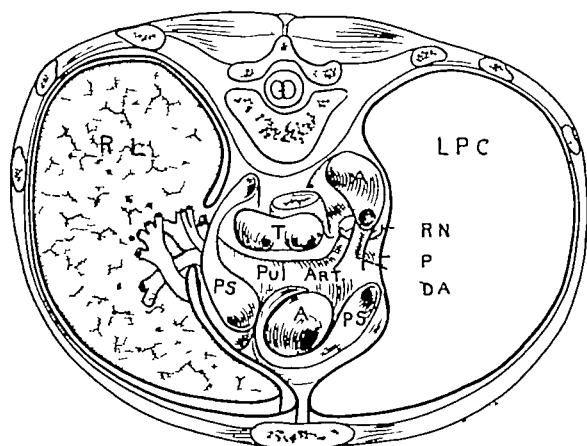


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## CITRATES IN THE TREATMENT OF INFANTILE RICKETS\*

ALFRED T SHOHL, MD,<sup>†</sup> AND ALLAN M BUTLER, MD<sup>‡</sup>

BOSTON

**T**REATMENT of infantile rickets with potent preparations of vitamin D leaves little to be desired. Indeed, the resultant cure is so satisfactory that it has tended to prevent an advance in our understanding of all the factors concerned in the pathogenesis of the condition. Presumably vitamin D cures rickets primarily by increasing the absorption of calcium, which in turn permits an increased absorption of phosphorus.<sup>1</sup> But other factors besides vitamin D affect the absorption of calcium and phosphorus and the healing of rickets. The most important of these are the levels and ratios of calcium and phosphorus in the diet, the acid-base value of the diet and its content of certain organic acids, especially citrates and to a lesser extent tartrates. The evidence for the last two of these factors is largely derived from animal experiments. It has recently been reviewed,<sup>2, 3</sup> and need not be presented here.

Although much has been learned about rickets from animal experiments, information derived therefrom can be applied to infantile rickets only by analogy. We have therefore been eager to try citrate mixtures, so effective in curing rickets in rats,<sup>3</sup> in the treatment of infantile rickets. Aside from the theoretical interest, the cure of rickets by factors other than vitamin D is of specific interest in the treatment of rickets resistant to vitamin D,<sup>4</sup> and perhaps other disturbances of calcium and phosphorus metabolism. Albright and Sulikowitch<sup>5</sup> have observed beneficial results from the administration of citrate mixtures in a patient with nephrocalcinosis. Moreover, such factors are of general significance for an understanding of the principles determining the adequacy of diets. The beneficial effects of large amounts of orange juice on calcium and phosphorus retentions, as observed by Hanke<sup>6</sup> and Chaney and Blunt,<sup>7</sup> may have to be re-evaluated in terms of the citrate content of such diets.

The paucity of untreated rachitic subjects at this clinic during the past two years has made available only 2 patients with infantile rickets in whom citrate mixtures could be used as the anti-rachitic agent. We are fully aware that neither case was ideal for such experimental work. The

complicating factors are given in the case histories and considered in the discussion. The prospect of obtaining more satisfactory cases in the near future is so doubtful that these preliminary results are reported so that this therapy may be given further trial by others.

*Case 1* (No I 22318) E S, an 11-month-old Negress, entered the hospital with the chief complaint of an upper respiratory infection of six days duration, and cough, fever, anorexia and vomiting of 2 days duration. She was born at term after a normal labor and weighed 8 pounds. She had never received cod liver oil or vitamin D concentrate.

Physical examination showed a well-developed and nourished infant with pronounced parietal and frontal bossing, an anterior fontanelle of 6 cm., rachitic metaphyses at both wrists and rachitic rosary. The temperature was 103°F, pulse 150 and respirations 50. The pharynx and both eardrums were red. There were signs of bronchitis throughout both lungs. There was a moderate sized umbilical hernia. Roentgenograms showed advanced active rickets and generalized decalcification.

The patient was put on a non-irradiated evaporated milk, Karo, and water formula and given 50 mg. of ascorbic acid per day, but no vitamin D. Hemolytic streptococci were recovered the next day from a throat culture and 20 gr. of sulfanilamide were given by mouth, and thereafter for the next 12 days 5 gr. every 6 hours. At the same time a small area of pneumonic consolidation of the lung was demonstrated by roentgenograms. The temperature fell to within normal limits within 24 hours and remained normal throughout the hospital stay. The signs of pneumonia rapidly cleared.

On the 9th day a citric acid sodium citrate mixture of 20 cc. of molar citric acid\* and 30 cc. of molar sodium citrate† was added to the formula as a diluent for the milk. This was continued for the following 36 days. During this period the patient gained in weight from 16.5 to 18.5 pounds.

Table 1 gives the concentrations of serum calcium, inorganic phosphorus, phosphatase and protein, the roentgenographic information concerning the rachitic changes and the diet during hospitalization. On the 45th day the rickets had healed so satisfactorily that the citrate mixture was discontinued, percomorph oil was prescribed and the patient was discharged home.

*Case 2* (No I 22224) D D, a 5 month-old Negro was admitted to the hospital with a chronic cough of 6 weeks' duration. The baby was born following a normal labor and weighed 8.5 pounds. He was said to have received daily ½ teaspoonful of cod liver oil and 2 teaspoonfuls of orange juice during the 4 weeks before admission. He was well until 6 weeks before admission, when he developed an upper respiratory infection. During the 2 weeks preceding entry he lost 2 pounds in weight.

Physical examination showed a baby with a rasping

$\text{H}_3\text{C}_6\text{H}_5\text{O}_7 \cdot \frac{1}{2} \text{H}_2\text{O}$  210 gm. per liter

$\text{Na}_2\text{C}_6\text{H}_5\text{O}_7 \cdot 5\frac{1}{2} \text{H}_2\text{O}$  357 gm. per liter  $\text{Na}_2\text{C}_6\text{H}_5\text{O}_7 \cdot 2 \text{H}_2\text{O}$  294 gm. per liter

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<sup>†</sup>Research associate in pediatrics, Harvard Medical School.

<sup>‡</sup>Assistant professor of pediatrics, Harvard Medical School.

and had to be opened in order to reach the ductus. While opening of the pericardium necessitates some loss of the pericardial fluid, it should not add any particular risk to the operation.

After the arch and the pulmonic conus are exposed, these two structures can be separated by blunt dissection, stripping away the areolar tissue which loosely binds them together. The most important structure to identify and scrupulously avoid is the left recurrent laryngeal nerve which loops around the aortic arch, passing lateral and posterior to the ductus. This structure may lie within a few millimeters of the ductus, but it can be readily freed and can be pushed posteriorly if necessary.

In no case have I encountered any difficulty in identifying this nerve in human material (in contrast to the dog), and operators should have no trouble in locating it and preserving it intact.

The diameter of the persistent ductus has little bearing on the possibility of ligating it, for a vessel 1 cm in diameter could be obliterated almost as easily as could a vessel 2 or 3 mm in diameter. However, the length of the ductus is of considerable importance. If the vessel is 0.5 cm or more in length it can be easily freed around its circumference and a tie placed on it, whereas a shorter vessel may defeat all efforts to free it and may make it impossible to place a circumambient ligature with any degree of safety. Should one be forced to deal with a ductus which is very wide and very short, it would probably be necessary to divide the ductus completely and to suture the defects in the aorta and the pulmonic arteries individually.

After the ductus is tied, the pleural covering of the mediastinum can be rapidly closed with a few interrupted sutures in order to smooth off the interior of the pleural cavity at this point. The thorax is then closed with a continuous catgut suture to the intercostal muscles, but before tightening the last suture the lung is completely expanded by increasing the intratracheal pressure via the anesthesia machine. The severed digitations of the pectoralis muscles are now brought together to restore their continuity, and the subcutaneous fascia and skin are approximated with interrupted sutures.

The anesthetic in human cases may be ether, but Cyclopropane is preferable. The use of a gas machine with either an intubating tracheal catheter or a closely fitting face mask is essential, because the anesthetist must be prepared at all times to give positive pressure when needed. This machine is of particular value when the chest is being closed and it is desired to re-expand the lung.

This method of exploring and ligating the ductus is a practical procedure which can be employed

for human beings, for I have recently undertaken the operation on 4 patients (Fig 3). Each of them survived the operation and had a remarkably smooth postoperative course without complications. The loud murmurs heard before operation have been reduced to minimal ones in 2 cases, and have completely disappeared in the other 2, in which double ligature was employed. The precordial thrill has disappeared in every case. In 2 patients there has been a reduction in the size of the heart postoperatively. In each case the low preoperative diastolic pressure has permanently risen 25 to 35 mm of mercury to a normal level. The success of the procedure suggests that the operation should be performed in certain selected cases as a safeguard against the dangers of subacute bacterial endocarditis or cardiac decompensation.

#### SUMMARY

The rationale for proposing surgical ligation of a patent ductus arteriosus is briefly presented. It appears that a number of individuals may enjoy a long life with this lesion and yet not suffer any important consequence. However, the adolescent child who possesses this abnormality faces such a great probability of serious complications arising from the patent ductus that surgical attempts to close the persisting vessel seem definitely justifiable.

A method has been devised whereby the patent ductus arteriosus can be adequately exposed by a lateral approach through the left pleural cavity. The safety of this exposure was amply demonstrated by practicing and perfecting the procedure on dogs. The superiority of the lateral route as compared to an anterior, transmediastinal opening was readily shown by examination of human post-mortem material. This operation has been successfully performed on 4 patients.

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lime salts was first detected in these patients on the 9th and 14th days of therapy, respectively. Not only the early date at which deposition could be detected but the amount of deposition in a given time compared favorably with that obtained with cod-liver oil. In Case 1 the patient received egg yolk during the latter part of the experiment, but this was not the cause of the early healing, for it was added to the diet only after healing had already begun. In Case 2 as much infection was present throughout the control period when there was no healing as during the first 2 weeks of therapy when healing occurred. It should be noted that both patients gained in weight during the periods in which the rickets was healing.

The serum analyses in both patients showed a lowering of the total calcium and a rise in the phosphate, and subsequently in Case 1 a rise in both. In this respect the babies reacted similarly to the rats. When the calcium was at the lowest point it was feared that tetany would supervene, yet it was never manifest by either a positive Chvostek's sign or convulsions. Repeated tests of the irritability to galvanic current were made, and it was demonstrated that latent tetany also was absent. It is interesting that the product of serum calcium and inorganic serum phosphorus was not high at the time deposition of lime salts was progressing. This fact, taken with the low calculated calcium ion concentration, indicates that the mechanism of calcification is not completely de-

scribed in either of these terms. The phosphatase content of the serum of both babies remained high throughout the period of observation compared with the normal range of 5 or 10 units by our modified Bodansky method. It is well known that high values may persist after other evidences of rachitic activity have disappeared, and may be found three to six months after adequate treatment. A return to normal during the short period of this study was not to be expected.

#### CONCLUSIONS

The evidence from the 2 cases reported indicates that mixtures of citric acid and sodium citrate induce healing in infantile rickets. This new form of therapy not only offers an adjunct to accepted measures for the treatment of infantile rickets, but also may have application to other types of disorders of calcium and phosphorus metabolism.

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cough, a temperature of 101°F, a pulse of 140 and respirations of 50. The general musculature was flabby, and the abdomen was protuberant. There was a small umbilical hernia. The anterior fontanelle measured 6 cm. Cranio-tables, beading of the costochondral junctions and rachitic metaphyses at the wrists were present. The pharynx and eardrums were injected. The tip of the spleen was palpable. Laboratory data included a red-cell count of

rendered the patient's subsequent history irrelevant to this study.

Table 2 gives the concentrations of serum calcium, inorganic phosphorus, phosphatase and protein, as well as further roentgenographic information concerning the rachitic changes, and the diet and therapy during the period of study. The roentgenograms presented unmistakable evidence that healing of the rickets had been

TABLE 1 *Summary of Data in Case 1*

HOSPITAL DAY	THERAPY	DIET	X RAY FINDINGS	SERUM CALCIUM	SERUM INORGANIC PHOSPHORUS	SERUM PHOSPHATASE MODIFIED	SERUM ALBUMIN
				mg %	mg %	Bodanick units	mg %
1	Sulfanilamide	Evaporated milk vitamin C	Marked active rickets	9.0	1.5	72	1.1
9	Sulfanilamide	Evaporated milk vitamin C	Marked active rickets	8.7	7.6	76	6.3
15	Citrate*	Evaporated milk cereal apple sauce banana	Marked active rickets	8.7	3.1	27	6.8
23	Citrate	Same plus 1 egg †	Early healing	8.8	3.1	29	5.9
33	Citrate	Same plus 1 egg †	Moderate healing	6.5	4.2	78	6.3
39	Citrate	Same plus 1 egg †	Advanced healing	9.5	4.1	38	0
46	Citrate	Same plus 1 egg †	Advanced healing	10.3	5.7	31	6.6

Citrate mixture started on 9th day

†Egg added from 21st day

5,030,000, a white-cell count of 10,900 and a hemoglobin of 11.9 gm per 100 cc. Roentgenograms showed considerable decalcification, a widened uncalcified zone at the ends of the diaphyses, slight lipping of the epiphyseal margins and subperiosteal new bone along the shafts of the long bones. There was considerable diffuse flocculent peribronchial congestion.

The patient was placed on a non irradiated evaporated milk formula and given 50 mg of ascorbic acid per day but no vitamin D. After 15 days of this control period in which there was no evidence of beginning healing of the rickets (Table 2), the citric acid-sodium citrate mixture

initiated and was progressing. However, both the roentgenograms and the concentrations of serum calcium and inorganic phosphorus showed that healing was not complete when the experimental study was interrupted.

#### DISCUSSION

The order of magnitude of the citrate dosage is readily reduced to familiar terms by stating that the amount of citrate given each patient daily corresponded approximately to that contained in five or six large oranges.

TABLE 2 *Summary of Data in Case 2*

HOSPITAL DAY	THERAPY	DIET	X RAY FINDINGS	SERUM CALCIUM	SERUM INORGANIC PHOSPHORUS	SERUM PHOSPHATASE MODIFIED	SERUM ALBUMIN
				mg %	mg %	Bodanick units	mg %
2	None	Evaporated milk no vitamin D 25 mg ascorbic acid	Moderate rickets	6.3	3.2	18	6.1
10	None	Evaporated milk no vitamin D 25 mg ascorbic acid	Moderate rickets	7.8	3.2	36	—
16	None	Evaporated milk no vitamin D 25 mg ascorbic acid	Moderate rickets	8.1	2.6	21	6.0
25	Citrate*	Evaporated milk no vitamin D 25 mg ascorbic acid	Beginning healing	6.3	3.8	74	6.0
29	Citrate	Evaporated milk no vitamin D 25 mg ascorbic acid	Beginning healing	5.6	3.5	21	6.1
34	Citrate	Evaporated milk no vitamin D 25 mg ascorbic acid	Healing rickets	8.5	2.9	14	6.7

Citrate mixture started on 16th day

described in Case 1 was started. The mixture was given daily in the formula from the 16th to the 41st day. The patient's upper respiratory infection continued about as at entry until the 14th day, when the temperature rose to 103°F, returning to normal in 2 days, again rising to 102.5°F on the 21st day, to drop the following day to within normal limits. From then until the 39th day he did well, and gained in weight from 16.5 to 17.3 pounds. On the 39th day the temperature rose to 104°F. At this time there was an acute right otitis media but no other signs of extension of the upper respiratory infection. Roentgenograms of the chest showed that the peribronchial congestion had markedly improved. Two days later the patient showed definite signs of pneumonia, the citrate therapy was discontinued and oil of percomorphum was added to the medication. This addition of vitamin D

In the experiments with rats,<sup>1</sup> citric acid in excess of sodium citrate was found more effective than the mixture used for these patients. The present proportions were used in order to avoid curdling of the milk. Subsequently it has been found that a more acid mixture, even as much as two parts molar acid to one part molar salt, is readily taken by patients, and it seems advisable that an acid mixture should be used.

The findings given in Tables 1 and 2 indicate clearly that by x-ray evidence healing had taken place during the administration of citrates and without vitamin D therapy. The deposition of

labile component (thiamin) has been regarded as the "anti-neuritic" or "anti-beriberi" factor, because it will cure in animals a disease which in some respects resembles human beriberi

Beriberi is a disease endemic in those parts of the world where milled rice is the staple cereal. Its first symptoms are loss of appetite and muscular weakness. Thereafter cardiovascular and neurologic signs develop and, according to which predominates, the disease has been differentiated into "wet" and "dry" types. The former probably represents the more acute and complete deficiency. Both the cardiovascular<sup>11</sup> and neurologic<sup>12</sup> manifestations of beriberi have recently been recognized in this country, occurring in cases of chronic alcoholism and occasionally in other subjects whose diet has been grossly abnormal. For further descriptions of these manifestations the reader is referred elsewhere.<sup>11, 14</sup> Briefly stated, the cardiovascular changes include edema, peripheral vasodilatation, tachycardia, cardiac enlargement and a liability to sudden circulatory collapse. The neurologic changes are those of the multiple sensory and motor neuritis formerly described as alcoholic polyneuritis, which has now been shown to be primarily due to nutritional deficiency rather than to the toxic effects of alcohol.<sup>15</sup>

It has long been recognized that beriberi can be cured by the administration of substances rich in vitamin B complex, but until very recently pure thiamin has not been obtained in amounts sufficient for clinical trial, and for this reason it has been impossible to determine with certainty the part played by thiamin deficiency in the development of the characteristic features of the disease. It now appears certain that the cardiovascular manifestations are a direct effect of thiamin deficiency, since administration of this vitamin complex results in most dramatic cures.<sup>11, 14</sup> It is less easy, however, to establish the etiologic relation of thiamin deficiency to the development of the neurologic changes. When the latter have progressed to the point of definite demyelination, recovery is necessarily slow, and so any therapeutic test is a relatively unreliable criterion of etiology, particularly since the administration of thiamin frequently improves the appetite and the consequent increase in food consumption presents the possibility that other dietary factors may contribute to the therapeutic response. However, there have been encouraging reports of definite improvement following the administration of thiamin in cases of alcoholic polyneuritis.<sup>17</sup> There is also evidence that the neurologic changes in alcoholism are liable to arise when the thiamin intake becomes theoretically inadequate.<sup>18</sup> In connection with this ob-

servation it must be emphasized that lack of thiamin may be associated with deficiency of other factors, as is illustrated by the fact that the onset of nutritional macrocytic anemia which is clearly not due to vitamin B<sub>1</sub> deficiency may coincide with the time when the thiamin intake becomes inadequate.<sup>19</sup>

Alcoholic polyneuritis is by no means the only type of nutritional polyneuritis seen in this country. Other conditions associated with a poor diet or gastrointestinal disorders may be accompanied by similar neurologic changes, and may well have the same etiology. It has been reported that the pain and numbness in pellagra may be relieved by thiamin.<sup>20</sup> The polyneuritis of pregnancy may respond to dietary supplements rich in vitamin B complex.<sup>21</sup> There have been many reports suggesting that thiamin deficiency may be responsible for the neuritis associated with diabetes, Korsakoff's psychosis, ulcerative colitis, gastric lesions and other conditions, but more work appears to be necessary before these theories can be accepted with certainty. It has also been suggested that some cases of Landry's paralysis may in reality be a form of beriberi.<sup>22</sup> The changes in the spinal cord which occur in pernicious anemia are probably not an effect of thiamin deficiency,<sup>23</sup> and this may also be true of similar changes in pellagra, sprue, celiac disease and beriberi. It is improbable that thiamin deficiency plays any part in the development of the other manifestations with which it is frequently associated in this country, such as anemia, pellagrous dermatitis, glossitis, achlorhydria and other gastrointestinal disturbances.

In conclusion, the present evidence suggests that thiamin deficiency is a factor, but not necessarily the only one, concerned in the development of nutritional polyneuritis. The appearance of polyneuritis in patients whose food intake is poor is, however, presumptive evidence of the existence of associated thiamin deficiency.

### Diagnosis

The diagnosis of thiamin deficiency at present depends on the clinical findings mentioned above and on the response of appropriate therapy. Several laboratory methods based on tests for the vitamin in blood and urine have been proposed, but none are as yet sufficiently well established to be used for routine purposes.

### Assay and Units

At present the only available method for estimating thiamin in foods is by feeding tests in animals. It has been usual to express the results of such tests in various arbitrary units, but now that pure thiamin is available as a standard of compari-

## REPORT ON MEDICAL PROGRESS

## THE WATER-SOLUBLE VITAMINS\*

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## THE VITAMIN B COMPLEX

RECENT years have witnessed a great advance in knowledge of the chemical structure and physiological action of several components of the vitamin B complex. Three members of this complex are now chemically identified and have been given definitive names. The name thiamin has been recently proposed for vitamin B<sub>1</sub>, "to emphasize that this factor is a definite chemical entity distinct from all other substances."<sup>1</sup> Riboflavin has been identified as one of the agents responsible for the activity formerly attributed to the hypothetical vitamin B<sub>2</sub> (or G). Nicotinic acid is now established as a most important factor in the prevention of pellagra, and is responsible for at least the greater part of the activity which was once attributed to the P-P (pellagra-preventive) factor. It is to be hoped that future chemical identification of other vitamins will lead to the gradual adoption of such specific names, in place of the present confusing system of nomenclature by arbitrary letters and numbers.

THIAMIN‡ (VITAMIN B<sub>1</sub>)*Chemistry*

Thiamin hydrochloride is a white, crystalline substance readily soluble in water, having the formula  $C_{12}H_{17}N_4OSClHCl$ . It is easily destroyed by heat, particularly in alkaline solution. It can be synthesized on a commercial scale, and the synthetic product is now available for therapeutic purposes.

*Physiology*

Recent work has progressed far toward providing an understanding of the part played by thiamin in the metabolism of the body. There is now no doubt that it is an essential factor in the enzyme systems concerned with carbohydrate metabolism. Thiamin deficiency both in man<sup>3</sup> and animals<sup>4</sup> may result in an accumulation of pyruvic acid ( $CH_3CO COOH$ ) in the blood. This substance

is a product of glycogen breakdown, and it has been shown that thiamin is capable of catalyzing the oxidative removal of pyruvic acid from the tissues of animals deficient in this vitamin.<sup>5</sup> The diphosphate of thiamin has lately been identified as the co-enzyme activating yeast carboxylase which removes carbon dioxide from pyruvic acid, converting it to acetaldehyde ( $CH_3CHO$ ).<sup>6</sup> However, it has not yet been shown with certainty that it is precisely this reaction with which thiamin is normally concerned in the body. It is possible that thiamin may play a part in several other fundamental metabolic processes, including the conversion of carbohydrates to fat.<sup>7</sup>

*Animal Pathology*

Animals fed on a thiamin-free diet lose their appetite, become thin and after several weeks develop a severe disturbance of the nervous system characterized by opisthotonos and inco-ordination. This disturbance is not the exact counterpart of the human disease beriberi, since it is evidently due to disordered metabolism of the nervous system rather than to anatomic lesions in the peripheral nerves. This is proved by the fact that the condition is dramatically cured within a few hours by the administration of pure thiamin. It is reasonable to suppose that the course of complete thiamin deficiency is too rapid to allow time for the development of definite anatomic changes in the nerves, but that such changes might result from chronic, though partial, deficiency of thiamin. This, however, is difficult to prove experimentally, since it is impossible to maintain thiamin-deficient animals in a state of good general nutrition on account of their anorexia, and degeneration of nerves can occur as a result of simple starvation.<sup>8</sup> True polyneuritis can be produced by partial deficiency of the entire vitamin B complex,<sup>9</sup> but also by diets adequate in thiamin and lacking only the other factors in the complex.<sup>10</sup> It seems clear, therefore, that thiamin deficiency is not the only etiologic factor in the production of nutritional polyneuritis in animals.

*Human Pathology*

Ever since the first differentiation of the vitamin B complex into more than one component, the heat

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‡For additional information the reader is particularly referred to Williams and Spies's book on thiamin.<sup>2</sup>



membered that thiamin deficiency rarely occurs without associated deficiency of other factors of the vitamin B complex, and, as pointed out above, these associated deficiencies may perhaps contribute to the development of polyneuritis. For this reason the best therapeutic results are not likely to be obtained from the administration of thiamin alone. At the present time there is no preparation suitable for parenteral administration of the entire vitamin B complex. In cases where intestinal absorption is likely to be grossly impaired the need may be partly provided for by the injection of liver extract and nicotinic acid as well as thiamin. In most cases, however, oral administration of vitamin B complex is entirely satisfactory. This is most easily provided by powdered brewer's yeast. Thirty to 90 gm daily is a suitable therapeutic dose, taken in milk or warm salted water. The administration of yeast by mouth is probably sufficient treatment for most cases of mild neuritis associated with alcoholism and other nutritional disturbances. It is useful in the prevention of polyneuritis in cases of hyperemesis gravidarum, and is also worth a trial in diabetic and post-infectious neuritis. In the absence of certain knowledge of the etiology of Korsakoff's psychosis it would seem advisable to administer large doses of all the components of the vitamin B group in the form of thiamin, nicotinic acid and liver extract by injection, and brewer's yeast by mouth. It should be remembered that patients with advanced neuritis and definite neurologic changes inevitably recover very slowly and often incompletely. This calls for perseverance in treatment in spite of only gradual improvement. Anorexia in the absence of other definite findings may occasionally be due to vitamin B deficiency, and its treatment may reasonably include the oral administration of yeast. This is particularly true in cases of underweight children with poor appetite. Three teaspoonfuls daily of autolyzed yeast is recommended as a suitable dose.

#### NICOTINIC ACID

Nicotinic acid has been familiar to organic chemists for many years, but it was not definitely recognized as a factor in the vitamin B complex until the end of 1937. It is a white, crystalline, heat-stable, water-soluble, easily synthesized substance with the simple formula  $C_6H_4N \cdot COOH$ .

#### Physiology

Prior to its recognition as a vitamin, nicotinic acid was identified, in the form of its amide, as an essential constituent of an important enzyme system. Codehydrogenase (cozymase) is composed of nicotinamide, ribose, phosphoric acid and adenine. This compound has been shown to be cap-

able of activating dehydrogenases, which are an important group of enzymes concerned with the oxidation of many organic molecules in the tissues. It thus appears that nicotinamide is an important factor in normal tissue oxidation.

In 1937 it was discovered that nicotinic acid will cure blacktongue, a deficiency disease of dogs analogous to pellagra.<sup>22</sup>

#### Human Pathology

Space does not permit any description of pellagra. For a full account of this disease the reader is referred to an excellent review on the subject.<sup>23</sup>

#### Sources

There has not yet been time to determine with certainty the distribution of nicotinic acid in foods, but judging by what was previously known of pellagra-preventing diets it must be present in physiologically active amounts in those foods which are also good sources of thiamin. It is certainly present in yeast and crude liver extract.

#### Therapy

It now seems evident that nicotinic acid is a specific curative agent for many of the clinical manifestations of both alcoholic and endemic pellagra.<sup>20-31</sup> Thus the mental symptoms, diarrhea, mucous-membrane lesions and the erythematous element of the dermatitis are all dramatically cured by nicotinic acid therapy. The neurologic manifestations, however, are apparently not affected.

The most effective dose of nicotinic acid has not yet been determined. The daily oral administration of 500 mg in five divided doses has been recommended as usually effective. It has also been given intravenously in doses of 10 mg five times daily in sterile saline.<sup>32</sup> The oral and parenteral administration of nicotinic acid is often accompanied by tingling sensations, increased gastric motility and dilatation of peripheral blood vessels, which suggests that larger doses than those recommended above might result in further undesirable reactions.

Since it seems probable that nicotinic acid therapy will leave unaffected at least some of the manifestations frequently associated with pellagra, it seems advisable to use nicotinic acid as an additional therapeutic weapon rather than as a substitute for the former treatment by good diet, yeast and liver extract,<sup>33</sup> though probably the doses of these latter need not be so large as formerly.

#### OTHER FACTORS IN THE VITAMIN B COMPLEX

The other factors in the vitamin B complex will not be discussed in detail here, since at pres-

son it is obviously preferable to express vitamin B<sub>1</sub> potency in terms of pure crystalline thiamin. Unfortunately there are difficulties in converting the units formerly employed into terms of pure thiamin. The best compromise value at the present is probably that one international unit equals 3.3 micrograms of thiamin chloride. For discussion of other units formerly employed the reader is referred elsewhere.<sup>2</sup>

### Sources

Thiamin is present in a great variety of foods, but no one article is a particularly potent source. The concentration of thiamin in most foods is about one part in a million. Bio-assay is at present the only available method of estimating thiamin in foodstuffs, and owing to the disparity of results obtained by different types of feeding tests the thiamin content of different foods can be stated only in very rough terms. Some of the richer sources of the vitamin and their approximate thiamin content are given below.\*

	mg
One cup of milk (250 cc)	0.1
One helping of beef (100 gm)	0.05
One helping of pork or ham (100 gm)	0.3
One helping of liver, kidney or heart (100 gm)	0.2
One egg	0.05
One helping of most vegetables (100 gm)	0.05-0.1
One orange or other fruit of similar size (120 gm)	0.06
30 peanuts (30 gm)	0.24
One slice of white bread (25 gm)	0.01
One slice of whole wheat bread (25 gm)	0.1

It will be seen from these figures that pork, ham, liver and peanuts are unusually good sources of the vitamin, and that whole-wheat bread is a distinctly better source than white bread. Dried brewer's yeast is a very potent source of thiamin, and usually contains about 0.1 mg per gram.

The thiamin content of the food may be greatly influenced by the method of cooking. Though fairly stable to heat in acid solution, in the presence of alkali (as when sodium bicarbonate is added to preserve the color of vegetables) it is soon destroyed at the temperature of boiling water. The process of baking and the use of baking powder are both liable to lead to considerable destruction of thiamin. Much of the vitamin may be dissolved and lost if fruits and vegetables are boiled in a large volume of water which is afterward discarded. In general it can be said that much of the thiamin in an ideal diet is provided by milk, meat, eggs, fruit and vegetables, and that if the supply of these more expensive foods is restricted it becomes increasingly important to provide whole-wheat bread and flour in place of refined cereals.

### Requirements

The thiamin requirements of an adult have been shown to be dependent on both weight and

caloric intake<sup>-1</sup> and, perhaps more specifically, on the carbohydrate consumption.<sup>2</sup> Thus the minimum requirement of a man weighing one hundred and forty pounds consuming 2000 calories daily is probably about 0.5 mg, while a man of two hundred pounds weight consuming 3000 calories may require at least twice this amount. This fact may explain why thiamin deficiency is liable to arise in alcoholic subjects whose consumption of foods rich in thiamin is frequently low, while their caloric intake (in the form of alcohol) is high.<sup>18</sup> It may also explain why signs of thiamin deficiency are rare in cases of general inanition with a reduced intake of both thiamin and total calories. It further indicates that thiamin deficiency is particularly liable to arise in patients whose metabolic rate and caloric consumption are raised, as in hyperthyroidism.<sup>25</sup>

The present evidence suggests that a safe optimum allowance for an adult is between 1 and 2 mg of thiamin daily. It is probably particularly important to maintain an optimum allowance during lactation. This is suggested by the frequency of infantile beriberi in those parts of the Orient where the usual diet is on the borderline of thiamin deficiency, and by the fact that the thiamin requirement of rats increases during lactation. Little is known of the thiamin requirements of childhood, but several reports of improved weight gain following the administration of substances rich in vitamin B<sub>26</sub> suggest that the diet of children in this country may sometimes fall short of the optimum in thiamin content. It is probably wise at the present time to assume that children require at least as much thiamin as adults.

### Therapy

Thiamin is specific in the cure of the cardiovascular manifestations of endemic and alcoholic beriberi.<sup>11-16</sup> Because of the danger of sudden circulatory collapse, treatment of such cases should be started early, and thiamin should be given parenterally to ensure rapid action. Initial doses of 20 to 50 mg daily given intravenously, or perhaps better intramuscularly, are recommended. The dose may be reduced to 10 mg when definite improvement begins and so maintained until recovery is assured. These doses may in most cases be greater than is really necessary, however, there need be no fear of ill effects from using these amounts. Parenteral administration of thiamin is indicated in cases of nutritional polyneuritis in which there is evidence of gastrointestinal disturbance, and consequently the possibility of defective absorption of substances given by mouth. Daily doses of from 2 to 10 mg may be given, according to the severity of the case. It should be re-

\* Adapted from Williams and Spies.<sup>3</sup>

nutrition, one above 50 mg is presumptive of excellent nutrition<sup>43</sup> Since both blood level and excretion may be influenced by recent dietary intake of the vitamin, it is considered that a more accurate estimate of the "degree of saturation" of the individual can be obtained by observing the effect of a test dose of the vitamin on the blood and urine levels There are many ways of carrying out this saturation test, and for further details the reader is referred to a recent review on the subject<sup>44</sup>

### Sources

Ascorbic acid occurs in most fresh vegetables The best sources are fruit and fruit juices One ounce of orange or lemon juice contains about 17 mg., an ounce of grapefruit juice 10 mg., of tomato juice 8 mg and of pineapple juice 5 mg One orange contains about 50 mg and half a grapefruit about 40 mg<sup>45 46</sup>

Ascorbic acid is very easily destroyed by oxidation This destruction is facilitated by heat, alkali, traces of copper and exposure to air These factors are of practical importance in cooking vegetables The water should be boiled (to drive off dissolved oxygen) before the vegetables are added It is advisable to use as little water as feasible, since the vitamin is freely soluble, and much may be lost when the water is discarded after boiling Sodium bicarbonate should never be added, the vessel used should have a lid, and should not be made of copper Modern methods of canning do not result in any great destruction of ascorbic acid if the reaction of the food is acid, as is the case with fruit juices Milk usually contains very little ascorbic acid by the time it reaches the consumer<sup>46</sup>

Pure synthetic ascorbic acid is available for therapeutic purposes, at a price that competes with orange juice as the cheapest way of supplying the vitamin

### Requirements<sup>45</sup>

There appears to be a great difference between the amount of ascorbic acid necessary to prevent scurvy and the amount required to keep the body saturated with vitamin Probably very few normal people are fully saturated, and it is extremely doubtful whether complete saturation is essential to perfect health At the same time it seems important that the degree of saturation be well above pre scorbutic level, in order to provide against any sudden increase in the demand for vitamin, as may happen, for instance, in infections

Infants probably require 5 to 15 mg a day to prevent the development of scurvy A daily dose of 20 to 50 mg should ensure a liberal supply

This amount is usually provided in the breast milk of a well-nourished mother, but even so, some additional vitamin may increase the margin of safety in breast-fed babies, and should certainly be given to bottle-fed babies A recommended procedure is to start with 1 teaspoonful of orange juice daily, and increase this gradually to 2 oz (30 mg of ascorbic acid) by the third month

The minimum daily requirement of children is probably about 20 mg To obtain complete saturation as much as 120 mg may be necessary Fifty milligrams is probably a sufficient "safety" allowance, the amount contained in one orange The minimum daily requirement in adults is about 30 mg, the safe allowance about 60 mg In pregnancy this amount should be doubled

There is good evidence that ascorbic acid is utilized with abnormal rapidity in a variety of infectious conditions<sup>47</sup> In rheumatic fever and tuberculosis, for instance, the blood level and excretion rates are frequently found to be low, despite an apparently adequate intake Although it is unlikely that ascorbic acid has any specific therapeutic value in infectious conditions, nevertheless it is well to ensure that such cases receive an ample supply

Patients receiving special diets, particularly for gastric ulcer, frequently receive inadequate amounts of ascorbic acid It is possible that this may be a factor in the causation of gastric hemorrhage, and it is therefore most important to insure an adequate intake of the vitamin in such cases<sup>48</sup>

### Treatment

In the treatment of scurvy large doses of the vitamin may be given (as much as 1 gm a day by mouth) But it is well to remember that toxic symptoms have been reported with very high dosages The vitamin may also be given parenterally, in the form of the monoethanolamine salt of ascorbic acid

Evidence of the beneficial effect of ascorbic acid in other conditions, as in hemorrhagic states other than scurvy, is not as yet sufficiently definite to require mention

### CONCLUSION

In this and a preceding article,<sup>49</sup> some account has been given of the principal properties of the vitamins, and of their use in the prevention and treatment of nutritional diseases Little mention has been made of the fundamental principles involved in questions of nutritional deficiency A few of these principles, which are fully discussed in a recent article,<sup>50</sup> may be summarized here as an appropriate conclusion

ent little is known of their importance in human nutrition. They have been recognized as indispensable to adequate nutrition in various species of animals. Future research may clarify their present complexity by chemical identification, and perhaps demonstrate that some of the factors at present described as separate entities are really identical. One of them, riboflavin, deserves mention, since it has been chemically identified and synthesized and has been shown to be the "prosthetic" or active group of Warburg's yellow enzyme, which plays an important part in normal tissue respiration. This fact suggests that it is probably an indispensable factor in human nutrition, and although no definite clinical manifestations have yet been attributed to deficiency of riboflavin and of the other remaining factors of the B complex, their importance in animal nutrition indicates that some, at least, are likely to be necessary for man. The distribution of riboflavin in foods closely follows that of thiamin.<sup>34</sup> All the known factors are present in yeast and some, at least, in liver. Nutritional macrocytic anemia has been noted in cases in which there is also evidence of thiamin deficiency,<sup>10, 35</sup> and a comparable anemia in monkeys has been shown to respond to yeast but not to thiamin or nicotinic acid.<sup>36</sup> In this connection it is noteworthy that the extrinsic factor of pernicious anemia has been thought to be part of the vitamin B complex.<sup>37</sup> As has been previously stated, a polyneuritis preventable by yeast may be produced in animals receiving an adequate intake of thiamin.<sup>10</sup> Finally, the spinal cord changes of beriberi, pellagra, pernicious anemia and sprue may be due to deficiency of one or more of the unidentified factors of the vitamin B complex. Demyelination of tracts in the spinal cord has been produced in pigs by a diet adequate in thiamin and riboflavin but deficient in other factors of the vitamin B complex.<sup>38</sup>

In conclusion, it may be said that besides thiamin and nicotinic acid there may yet be other factors in the vitamin B group which are almost equally important. For this reason, patients who show evidence of vitamin B group deficiency should be treated not only with synthetic thiamin or nicotinic acid, but also with liberal doses of the entire complex in the form of yeast, and with foods that are rich both in thiamin and in the factors associated with it.

#### ASCORBIC ACID (VITAMIN C)

##### *Chemistry*

Since vitamin C has been isolated and synthesized it has been given the names cevitamic acid and l-ascorbic acid, both of which are now in com-

mon use. It is a white, crystalline substance, freely soluble in water, with the simple formula  $C_6H_8O_6$ . It is very readily oxidized by the loss of two hydrogen atoms, to 2-dehydro ascorbic acid. This change can be reversed by reducing agents. But if oxidation proceeds further than dehydro-ascorbic acid the vitamin is irreversibly changed and its activity cannot be restored.

##### *Physiology*

Little is known of the part played by ascorbic acid in the chemistry of the body. The fact that it is capable of being reversibly oxidized and reduced has suggested that it may act as a respiratory enzyme in the tissues, but there is no direct evidence for this. The highest concentrations in the body are found in the suprarenal cortex and the pars intermedia of the pituitary gland.<sup>39</sup>

##### *Pathology*

The pathologic changes resulting from ascorbic acid deficiency are as follows. There is a marked diminution of intercellular substance, fibrous tissue is poor in collagen, the teeth lack denture, the growing points of the long bones are deficient in osteoid tissue, which is replaced by calcified cartilage, giving a characteristic picture by x ray. The bone marrow is hypoplastic.<sup>40</sup>

Clinically, ascorbic acid deficiency results in scurvy, which is characterized by the following abnormalities. Hemorrhages are common, particularly under the periosteum, petechiae and perifollicular hemorrhages occur in the skin. The gums are swollen and boggy, and bleed easily. The teeth may be loose. Anemia is common, and in infants and children growth of the long bones is arrested.<sup>41</sup>

Vitamin C can be determined with comparative ease in blood plasma and urine. The estimation is reliable provided that certain precautions are taken in carrying it out. A large number of papers on the blood level and urinary excretion of ascorbic acid have recently been published. Many of the conclusions are still under discussion, but some important facts have emerged which now appear to be well established. The level of ascorbic acid in the blood plasma is very low in scurvy, usually less than 0.2 mg per cent, and frequently so low that it cannot be estimated. A fasting blood plasma level of 1.2 mg per cent or higher is evidence of excellent ascorbic acid nutrition. It appears that vitamin C is a threshold substance, and is excreted in the urine when the blood level exceeds 1.4 mg.<sup>42</sup> People who are apparently healthy show figures which range between 0.5 and 1.4 mg per cent. A twenty-four-hour urinary excretion of less than 10 mg is evidence of poor vitamin C

CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C CABOT, M.D.

TRACY B MALLORY, M.D., *Editor*

## CASE 25121

## PRESENTATION OF CASE

A fifty-six-year-old married Polish tailor was admitted with marked cyanosis of the face, neck and arms and gasping respirations.

Seven weeks before admission he entered an outside hospital. He had had chronic bronchitis for forty years, dyspnea on exertion for ten to fifteen years and occasional blood-streaked sputum for three to four years. For three and a half weeks before admission to the outside hospital he had had marked swelling of the face, neck and chest with coughing, inspiratory difficulty and wheezing. Physical examination revealed obvious respiratory distress, marked swelling of the face, neck and chest, lacrimation and edema of the conjunctivae, cyanosis of the face, ears, fingers and nail beds. The veins of the neck, chest and arms were distended and did not collapse. There were many telangiectatic areas over the chest and back. There were many crackling rales at the bases of both lungs and many respiratory wheezes, especially on the left. The heart was normal. The blood pressure was 110 systolic, 70 diastolic in both arms. Examination of the abdomen was negative. There was questionable clubbing of the fingers.

The urine examination was negative. The blood showed a red-cell count of 4,500,000 with 92 per cent hemoglobin and a white-cell count of 12,400 with 78 per cent polymorphonuclears, 7 per cent large lymphocytes, 14 per cent small lymphocytes and 1 per cent eosinophils. Blood Hinton and Wassermann tests were negative. The stools were normal except that one was guaiac positive. The sputum was pale green and contained much pus, many organisms, but no acid-fast bacilli. The venous pressure in the left arm was 425 mm, in the right leg 130 mm.

He remained in the outside hospital thirty-eight days. Respirations varied from 20 to 35 per minute. X-rays revealed a widened supra-aortic shadow, probably the vena cava. Biopsy of an axillary gland was negative. Bronchoscopy showed extensive bilateral bronchiectasis, marked congestion of the entire tracheobronchial tree, but no evidence of tumor. Lipiodol confirmed the pres-

ence of bronchiectasis, most marked at the left base. His right arm became more and more edematous, but this was eventually controlled with mercurial diuretics. After each diuretic his face and arm returned to almost normal size, though the swelling of his neck persisted. His respiratory distress was not materially aided. He lost 15 pounds in weight during the thirty-eight days chiefly because he became fatigued while trying to eat for more than a very short period of time. His last diuretic caused a loss of 3000 cc of fluid and he felt better than at any time during his hospital stay. He was discharged to his physician.

Nine days later he entered this hospital. Physical examination was similar to that on admission to the other hospital except that he was more severely affected with difficult, gasping respiration and cyanosis.

His temperature was 97°F, pulse 90, respirations 30.

X-ray films of the chest showed the right diaphragm to be unusually low, limited in excursion and irregular in outline. The left side of the diaphragm was not seen. The right lung was large and bright and there were many areas of rarefaction with thin walls, apparently blebs. There were many similar areas of rarefaction in the left lung, especially in the apex. Linear density was seen in both lungs apparently due to dilated blood vessels. There was homogeneous density at the left base rising to the seventh rib posteriorly and the gas bubble in the stomach was displaced downward below the twelfth rib. The heart and mediastinum were in normal position. Both lung roots were grossly enlarged. There was an oval mass just above the right main bronchus to the right of the mediastinum and in contact with the vena cava measuring 4 by 2.5 cm. The shadow of the vena cava appeared large above this point. The aorta was not dilated. The trachea was displaced slightly to the left just above the arch of the aorta. The carinal angle was widened and the main bronchi were indistinct. There was no evidence of disease in the bones.

Six and a half hours after entry the patient suddenly became cyanotic and had severe respiratory difficulty. An attempt was made to aspirate mucus from the larynx, and coramine was given subcutaneously and intravenously. After three minutes he stopped breathing and artificial respiration was begun. An apical heart beat was still present. A needle was introduced into the sixth right interspace in the anterior axillary line and about 400 cc of air was easily removed with a syringe, but on holding the connecting tube under water no bubbling was seen. At this time

1 Nutritional disease may arise not only from faulty diet, but also from defective absorption and utilization of various elements in the food

2 Dietary deficiency as seen in this country is rarely confined to deficiency of a single factor. It is therefore important that the physician should look for evidence of multiple deficiencies in any recognized case of nutritional disease

3 The administration of pure vitamin preparations is rarely sufficient for the complete cure of any deficiency disease, and should never be considered as a substitute for a good general diet

4 Most dietary deficiencies are best prevented by directing the inquiring patient to the grocer rather than the druggist

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DR. KING So that there are probably nodes beneath the carina?

DR. HAMPTON Yes, that is a reasonable assumption I would like to see a little more compression of the main bronchi than you see here They do not seem to be very small

DR. KING The emphysema is probably not obstructive emphysema due to partial bronchial obstruction

DR. HAMPTON At any rate it is long-standing with bleb formation

DR. KING So we have no evidence that the mass presses on the bronchus from the outside?

DR. HAMPTON No

DR. KING Granted then that this is a lymph node, may it be enlarged because of infection secondary to chronic bronchiectasis? This would be an unusual finding and there is certainly no evidence of suppurative mediastinitis with a mediastinal abscess

DR. HAMPTON I should not think so

DR. KING Let us then discard the possibility of pulmonary infection with secondary mediastinitis and consider next the emphysema and its possible relation to the mediastinal obstruction Could emphysematous lungs press on the superior vena cava with resulting venous obstruction? Emphysema can do queer things and there are cases reported of choked disks supposedly caused by venous obstruction from emphysema In this case, however, I do not believe that we have the right to blame the whole picture on the emphysema and forget the mass which is apparently pressing on the vena cava

DR. TRACY B. MALLORY We have had one case with a fairly good upper mediastinal syndrome and nothing but emphysema to explain it

DR. KING But he did not have a mass and fluid to go with it

DR. MALLORY No

DR. KING We are then gradually being forced to consider the mass as a tumor and the tumor as responsible for the mediastinal obstruction, but there is one further possibility which must be at least mentioned, namely thrombosis of the superior vena cava secondary to long-standing pulmonary infection or in association with tumor Possible evidence of thrombosis with a fatal pulmonary embolus is shown in the last x-ray which was a postmortem film In this film there is a shadow in the left midlung field which was not present in the antemortem films The symptoms just before death could have been caused by pulmonary embolism although it is evident that the doctors in charge of the case believed that the sudden death was due to spontaneous pneumothorax

DR. HAMPTON I might say that I did not agree with the pathologist on this case The patient was said to have had a pneumothorax I cannot see it

DR. KING They put a needle in and took out 400 cc of air

DR. HAMPTON A bleb could cause what they found They could have put their needle directly into a bleb and obtained air under pressure

DR. KING They tapped in the anterior axillary line where many blebs were present I assume that they got the air from a bleb What about the shadow in the left lung field in the postmortem film?

DR. HAMPTON I thought it was due to an acute process like pneumonia

DR. KING You do not want to call it an infarct?

DR. HAMPTON No, sir

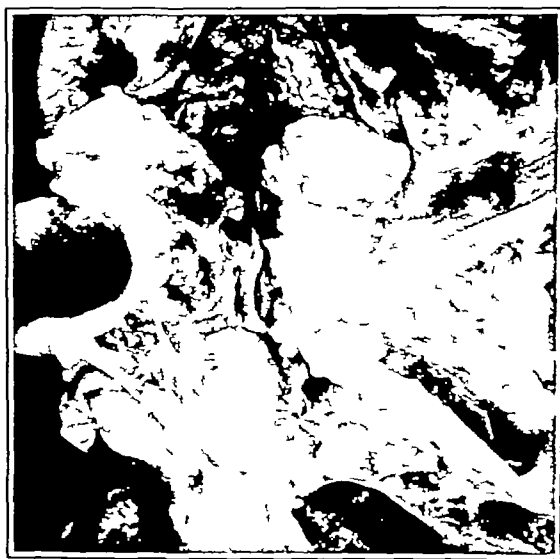


FIGURE 1 *Small Primary Lesion of Bronchiogenic Carcinoma at Mouth of Tertiary Bronchus*

DR. KING We have now lost what evidence there was for pulmonary embolism and infarct and have narrowed the diagnosis to tumor of a lymph node pressing on the superior vena cava There are a number of possibilities but it seems to me that the evidence is in favor of bronchiogenic carcinoma, probably primary in the left lower lobe with metastasis to the tracheobronchial lymph nodes on the right side of the trachea and beneath the bifurcation It is true that the bronchoscopy did not show any tumor in the main bronchi but in many instances the primary carcinoma is in the fine bronchi beyond reach of the bronchoscope

DR. FRANCIS M. RACKEMAN What about Hodgkin's disease?

the apical heart beat could no longer be heard and the pupils did not react to light. He died seven hours after admission.

#### DIFFERENTIAL DIAGNOSIS

DR DONALD KING In summary, we are dealing with a man of fifty-six who for forty years has had bronchitis, for fifteen years, dyspnea on exertion, for four years occasional blood-streaked sputum, and for ten weeks swelling of the face, neck and chest with cough, inspiratory difficulty and wheezing. There has been no fever. Physical examination showed crackling rales at the bases and some musical rales particularly on the left side. The venous pressure in the arms was high. The laboratory reported purulent sputum with no tubercle bacilli, and a negative Hinton. Bronchoscopy showed no intrabronchial tumor, but there is no note as to whether there was pressure from outside the bronchus. A biopsy of an axillary gland was negative.

There was obvious superior mediastinal obstruction and, besides this, x-ray of the lungs showed emphysema and large blebs. Lipiodol injection is said to have shown bronchiectasis. There was also fluid in the left pleural space and some masses in the region of the lung roots. We have then a chronic long-standing lung condition and superior mediastinal obstruction which has been present for about ten weeks. The first question is whether we can explain both findings by a single cause, and the decision must rest mainly on x-ray interpretation.

Let us consider first the two outstanding chronic infections, tuberculosis and syphilis. As you will see from examination of this x-ray film the appearance in the lung fields is not consistent with tuberculosis and the masses at the lung roots are not calcified tuberculous nodes. It is possible to have tuberculous mediastinitis due to breaking down of a tuberculous gland but there is no evidence here that such is the case. Syphilis must always be considered when there is mediastinal obstruction and one may have either syphilitic mediastinitis or pressure from aneurysm. In this case syphilis is ruled out by the negative Hinton and the x-ray which does not suggest aneurysm.

If you examine this film closely there is no question of the evidence of emphysematous blebs at the apices. Is there associated bronchiectasis? We have the statement that lipiodol injection did show dilatation of the bronchi but these films are not present for examination. The plain films which we do have are consistent with bronchiectasis. Is that not so, Dr Hampton?

DR AUBREY O HAMPTON It is not the type of picture I usually think of as due to bronchi-

ectasis, for the lobes involved are not reduced in size. They are blown up. The bronchi are dilated probably due to pulmonary fibrosis, but this is not the picture of the lung of bronchiectasis without emphysema. You can see honeycombed shadows throughout the lung, more marked at the right base which, if due to bronchiectasis, would indicate that there is more at the right base than elsewhere. The left base I cannot see because of a homogeneous shadow.

DR KING That is not collapsed left lower lobe with bronchiectasis?

DR HAMPTON No, it does not have the shape of a collapsed lobe. There could be collapse beneath this shadow which simulates fluid. The heart is not displaced to the right, if at all, it is toward the left, and that would indicate collapse of the left lower lobe with fluid or with a mass in the lung occupying about the same space as that amount of the fluid. This upward rise of the lateral margin of the shadow does look like fluid, but I think it would be difficult to rule out a mass in that area.

DR KING So all the help you can give me is that there is fluid at the left base?

DR HAMPTON With either collapse of the left lower lobe or tumor occupying the area of the left lower lobe.

DR KING He has large blebs at the apices. They do not show from a distance but are obvious on close examination.

DR HAMPTON They are even more obvious in the lateral view. There are huge ones anteriorly beneath the sternum. This oval mass to the right of the trachea and above the right main bronchus is definite and above it the shadow of the vena cava is definite. In a patient with emphysema the superior vena cava shadow should be narrow, but here it is wide.

DR KING We agree then that there is emphysema, emphysematous blebs, fluid at the left base and either collapse of the left lower lobe or tumor in this region. We must consider next the masses at the lung root, particularly the oval mass which Dr Hampton has mentioned. This mass looks to me like a lymph node. Do you agree with this?

DR HAMPTON Yes, I think it is.

DR KING I would think so, and as far as I can tell, it is a node pressing on the superior vena cava.

DR HAMPTON Yes, the lower end of the superior vena cava.

DR KING Is that mass pressing on the right main bronchus?

DR HAMPTON I do not think so. You can see the bronchus fairly well and the carinal angle appears wide.



obstruction. A certain number of cases, and this one falls into the category, show multiple foci of pulmonary fibrosis. The lung, of course, is an elastic organ and has to fill the thoracic cavity. If some such process as organizing pneumonia, bronchiectasis or multiple infarcts destroys large areas of alveolar tissue and reduces them to minute fibrous scars the remaining lung tissue must dilate to fill their place, the volume of the thorax remaining constant. It seems to me that in a large proportion of cases of structural emphysema one can prove that a significant amount of lung tissue has been destroyed and then you get secondary dilatation of the remainder of the lung. That is not the whole story but I think it is a partial one.

DR WILLIAM BOYD. Do you not think that this case illustrates one of the great reasons for the recent increase in the incidence of bronchiogenic carcinoma? Do you think that thirty years ago a primary tumor would have been discovered?

DR MALLORY. I feel quite sure it would not. I think even ten years ago one might easily have passed this off as primary round-cell sarcoma of the mediastinum. Now we have become suspicious to the point where we believe bronchiogenic carcinoma through its metastases is the commonest cause of mediastinal tumor.

## CASE 25122

### PRESENTATION OF CASE

A sixteen-year-old Portuguese schoolboy was admitted complaining of swelling of the right lower leg.

The swelling gradually appeared without a previous story of trauma during the year before entry. It was not constant but would reach a size of 7.5 cm in width by 2.5 cm in thickness, last two to three days, then gradually regress only to reappear after three to four days. The swelling caused a dull pain, but tenderness could be elicited by pressure over the area when the swelling was absent. The area of enlargement did not become constant until about six months before admission at which time it began to grow more rapidly, the pain becoming constant. Three months later x-rays were taken, a diagnosis of sarcoma made, and amputation advised but refused. Two months before entry two doses of x-ray treatment were given which had no effect on the mass except that it became red and very tender. Three weeks prior to admission the pain became most severe, originating in the tumor and radiating down the medial aspect of the right leg. The pain was constant and made worse by exercise or pressure. At no time had there been

fever, chill or malaise. During the last three weeks he had had anorexia because of the pain. He believed that he had lost three to four pounds in weight during the last year. Both parents were living and well. He had two brothers in good health though one of them had a cleft palate. The past and family histories were otherwise non-contributory.

Physical examination showed a well-developed and nourished boy in obvious distress from a painful right leg. The general physical examination was negative except for the lesion on the leg. The blood pressure was 120 systolic, 80 diastolic. Over the anteromedial aspect of the right tibia in its middle third was a large, slightly fluctuant, red, slightly hot swelling measuring 10 by 10 by 5 cm. Slightly enlarged tender nodes were present in the right groin.

The temperature was 99.5°F., pulse 105, respirations 20.

The urine examination was negative. The blood showed a red-cell count of 5,250,000 with 75 per cent hemoglobin, and a white-cell count of 17,400 with 82 per cent polymorphonuclears, hematocrit 38 per cent. The corrected sedimentation rate was 0.45 mm per minute. The serum calcium was 10.35 mg per cent, phosphorus 4.8 mg per cent, phosphatase 17.92 units. A blood Hinton test was negative.

X-ray films showed destruction of the medullary portion of the right tibia at the junction of the middle and lower thirds over an area approximately 7.5 cm in length. The cortex was increased in thickness and showed new-bone formation arranged in "onion-skin" layers over this area. The cortex was broken through in one place over which there was a large soft tissue mass in which many bony spicules were present. X-ray films of the chest showed no evidence of metastases.

The patient felt well and his chart remained essentially normal during the first three days in the hospital. On the fourth day an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR. CLAUDE E. WELCH. I do not know whether we should see the x-rays first. I think Dr. Holmes might give away the diagnosis if it is what I think it is.

DR. GEORGE W. HOLMES. I know the answer.

DR. WELCH. Perhaps I had better talk first then. The problem here is to determine whether this is an inflammatory mass or tumor, our differential diagnosis between these two involving chronic osteomyelitis versus some form of bone tumor, of which I think we may exclude all types

DR KING One always has to think of it, of course I meant to speak of it. It is not the typical x-ray picture, is it Dr Hampton? I should doubt if we have to consider it. You do have to consider metastatic malignancy to these nodes. It might be from the stomach or several other sources, but there is no evidence of a primary source outside the chest.

DR HAMPTON No.

DR WYMAN RICHARDSON What about congenital cyst of the lung?

DR HAMPTON These cavities are multiple and thin walled and they look more like blebs than congenital cysts. They are in the location you would expect blebs. They contain no fluid. There is an associated big lung and low diaphragm and a lot of evidence of pulmonary fibrosis. I cannot see how cyst would be possible.

#### CLINICAL DIAGNOSES

Bronchiogenic carcinoma with mediastinal metastases

Emphysema

Rupture of emphysematous bleb with pneumothorax, right side

#### DR KING'S DIAGNOSES

Bronchiogenic carcinoma left lower lobe with metastases to the tracheobronchial lymph nodes

Pulmonary emphysema and emphysematous blebs

#### ANATOMICAL DIAGNOSES

Bronchiogenic carcinoma of left upper lobe with mediastinal metastases and obstruction of superior vena cava

Pulmonary emphysema

Pulmonary fibrosis, focal.

Acute pleuritis with effusion

#### PATHOLOGICAL DISCUSSION

DR MALLORY The postmortem examination showed, as Dr Hampton has already indicated, one finding over which there will be some question. The thorax was punctured through a water seal and air bubbled out under pressure. This was interpreted as evidence of pneumothorax. I think x-ray evidence of pneumothorax is more reliable than such a procedure. If by postmortem x-ray they cannot find it I doubt if it is present, and what we did at autopsy was probably what was done during life—a puncture directly into an emphysematous bleb. Moreover the lung was not collapsed as one would expect with a positive pressure pneumothorax. The lung did show a

severe grade of emphysema which was quite diffuse. We found little or nothing at the left base except a considerable amount of fluid. The left lower lobe was slightly but not markedly atelectatic.

DR KING Was the fluid bloody or clear?

DR MALLORY It was yellow, slightly cloudy, not bloody. There were a number of masses in the mediastinum which appeared to be enlarged carinal lymph nodes and lymph nodes in the superior mediastinum, completely surrounding the lower end of the vena cava which was evidently obstructed by pressure from without. It was not invaded and contained no thrombus at the time of autopsy. A section of these nodes showed quite clearly that they were tumor, and no obvious primary source could be found at the time, but further dissection of the lungs after fixation showed a small tumor nodule about 1 cm in diameter in the left upper lobe fairly near to the most prominent gland that you see in the x-ray picture which microscopically is characteristic of primary bronchiogenic carcinoma.

DR HAMPTON How large did you say it was?

DR MALLORY A little over 1 cm in diameter. The cells are very small, very uniform, and correspond fairly closely with the so-called oat-cell carcinoma although the cells are rounder than is characteristic. There was no infarction or pulmonary embolus. There was a slight diffuse dilatation of the bronchi throughout the lower lobes but no marked bronchiectasis.

A PHYSICIAN How large was his heart?

DR MALLORY Normal. There was no cor pulmonale.

DR CHAMP LYONS We thought clinically that he had ruptured an emphysematous bleb when he had his acute episode.

DR HAMPTON There was no explanation of the sudden death?

DR RICHARDSON No embolus on the right side?

DR MALLORY No.

DR RICHARDSON Were you able to form any opinion as to the origin or cause of this emphysematous condition? It is a queer picture. This fellow started with symptoms at the age of sixteen according to the story.

DR MALLORY There are numerous theories of the origin of emphysema, none of which are very satisfactory. Very prolonged chronic bronchial infection is reported as one of the most frequent predisposing factors. It may or may not be associated with asthmatic paroxysms. It is usually assumed that the emphysema is produced by a process of bronchial obstruction. It is not at all clear, however, looking at the lungs of these individuals at postmortem, that there is bronchial

what they are by cutting into them Do you want to say anything about the gross appearance of these tumors?

DR MALLORY I should not want to commit myself very often on the gross appearance

DR TAYLOR In spite of amputation I should think that the prognosis was very poor I think that members of the staff who have not happened to see Dr Simmons's report of the results of sarcoma treatment at this hospital in a recent number of *Surgery, Gynecology and Obstetrics*\* would do very well to consult it, because he has presented his results in a very interesting fashion and also demonstrated that the prognosis in Ewing's tumor even with radical surgery is not very good

DR SIMMONS I have records of twenty-five personal cases of Ewing's that I have seen here and at the Huntington and other places Every one is dead There are a few in the registry without evidence of disease over five years but a very few

DR AUBREY O HAMPTON We had a five-year cure with radiation, but at the sixth year he had a recurrence

DR MALLORY What is the likelihood of developing pathological fracture if the lesion is untreated or treated only by radiation?

DR SIMMONS I have seen them occur That is all I can say

DR HOLMES I would like an opportunity to treat some of these cases in which the surgical results are bad I think one of the reasons we failed in the past is that we did not take into consideration the extent of the disease in the bone marrow The surgeon removes the whole bone. I should rather like to see a few cases treated that way The result should be better

#### CLINICAL DIAGNOSIS

Ewing's tumor (endothelioma) of right tibia

#### DR WELCH'S DIAGNOSIS

Ewing's tumor

Simmons, C. C. Bone sarcoma factors influencing the prognosis  
Surg. Gynec. & Obst. 63 67 76 1939

#### ANATOMICAL DIAGNOSIS

Ewing's tumor of right tibia

#### PATHOLOGICAL DISCUSSION

DR MALLORY From the gross examination of the specimen we were not able to show that it extended any greater distance along the marrow cavity than the external swelling

DR TAYLOR Do you want to say anything about the difficulty of making frozen sections of these tumors?

DR MALLORY One is faced with considerable difficulty in that in many bone tumors a large amount of the tumor mass is going to be more or less calcified and it may prove quite impossible to cut a frozen section If one succeeds at all one has to cut such a thick section that the results are quite unsatisfactory The success of biopsy in these cases I think depends in about 90 per cent of the cases upon the surgeon If he will cut really into the tumor rather than giving you only the overlying capsule and if he will choose a portion of the tumor which is soft but which is not entirely necrotic there is no reason one should not be able to make an accurate frozen section diagnosis The selection of the material is of prime importance and that depends on the surgeon rather than the pathologist

DR TAYLOR Another difficulty in the matter of biopsy is that if you are dealing with a tumor in the region of a pathological fracture you may think that you have an ideal specimen for the pathologist only to find that you have given him only nonspecific reparative tissue

DR MALLORY It is quite possible for a malignant tumor to be surrounded by callus which may be difficult in gross to distinguish from the tumor One may get a completely false impression in that way

DR SIMMONS I think all the more about a remark Dr Ernest A Codman made here He said that when the clinician and the radiologist are in doubt the pathologist usually is too

DR MALLORY I would second that

except Ewing's and osteogenic sarcoma. In favor of osteomyelitis one might consider all the history and all the physical findings with two or three exceptions. The first and most important exception is the fact that the lesion is located in the central portion of the shaft of the tibia. The end of the tibia is the commonest spot for a chronic osteomyelitis of this type in contradistinction to a primary tumor. The increase in the white-cell count and slight fever, mean nothing in so far as the differential diagnosis of osteomyelitis and a primary tumor is concerned. When we consider the primary bone tumors of which Ewing's tumor and osteogenic sarcoma are the only two of importance in this case, we have a great deal in favor of Ewing's sarcoma. If we can trust the statement from the history that the swelling has been intermittent, we have one of the features of Ewing's tumor which is quite characteristic. Repeated small hemorrhages that occur in a very cellular tumor produce this change. They are not characteristic of osteogenic sarcoma which has much more stroma and none of these frequent fluctuations in size, nor of osteomyelitis. A Ewing's tumor should have responded to x-ray treatment if a sufficient amount had been given, we have no proof, however, that a therapeutic dose was administered. I do not think we have enough in that one statement to eliminate a Ewing's tumor. All the rest of the findings are in favor of Ewing's tumor.

Is there anything we can consider in favor of osteogenic sarcoma? The high white-cell count is unusual. I would expect in an osteogenic sarcoma with this much bone destruction and new bone formation that we ought to have an even higher serum phosphatase. The location is definitely in favor of Ewing's in contradistinction to osteogenic sarcoma, which more typically occurs in the head of the tibia. My preoperative diagnosis then would be a Ewing's tumor.

DR. HOLMES. I will continue the discussion by pointing out some of the characteristics of this lesion and the difference between osteogenic sarcoma and Ewing's tumor. I agree with Dr. Welch that we would be wasting our time to discuss the other possibilities. It is one of these two. It is a malignant tumor situated in the midportion of the shaft. It has characteristic ray formation, a soft tissue tumor, and has a considerable amount of onion-skin formation which is said to be commoner in Ewing's than in osteogenic sarcoma. It may occur in both. A localized tumor with marked ray formation is commoner in osteogenic sarcoma than in Ewing's. You would expect Ewing's tumor to extend farther up the shaft and have less of this marked ray formation. The

position of the tumor is commoner in Ewing's than osteogenic sarcoma. I think from x-ray alone the preponderance of evidence is in favor of Ewing's tumor, if you take the history into consideration, it is distinctly so. I might add that the fact that he had some unknown amount of x-ray treatment would not be of any importance in this discussion.

DR. TRACY B. MALLORY. Dr. Simmons, have you any comment?

DR. CHANNING C. SIMMONS. I know the answer. All I can say is that in Ewing's tumor you often get a slightly elevated white count and temperature. The situation is typical of Ewing's, but so far as the new bone formation goes it is unusual. We have cases in the museum upstairs, however, in which there was even more bone formation than that. In this situation, however, I should favor Ewing's tumor rather than osteogenic sarcoma.

DR. MALLORY. Do you think you can trust the phosphatase reaction?

DR. SIMMONS. With as much new bone formation as in this case I should expect a high phosphatase and you can get that in Ewing's. I saw a statement that onion-skin appearance did not occur in Ewing's until after they had had radiation. It was new to me, and I should like to ask Dr. Holmes about that.

DR. HOLMES. I should doubt that statement.

DR. ERNEST M. DALAND. I should like to add one thing. This boy was seen at Pondville before coming here where he is said to have received two x-ray treatments. That was not true. He had two x-ray photographs and never received any treatment. I tried to impress that on the resident staff when he was in the hospital this time but did not get it across apparently. At the time we saw his pictures they had an onion skin appearance without ray formation and for that reason we made the diagnosis of Ewing's tumor and advised amputation. That was refused and no treatment given.

DR. GRANTLEY W. TAYLOR. I operated on this boy and our preoperative diagnosis was Ewing's tumor. We explored the tumor which I think is the reasonable thing to do when you are confronted with the question of doing a very radical surgical procedure. An immediate frozen section revealed the nature of the lesion and, without removing the tourniquet, amputation was carried out above the level of the tourniquet. It was a thigh amputation. The gross pathological picture is said to be characteristic. I am not familiar enough with the gross appearance of these tumors to have a great deal of confidence in deciding

low men to be important individuals whether we will it or not, many more consider importance as an end in itself, and in achieving that end may do great good or great harm to those about us, a great many more are bent on being considered important, regardless of our deserts, and a not inconsiderable remainder either do not know what it is all about or derive a quiet satisfaction from being privates in an army composed mainly of top sergeants, if not of generals

Unfortunately for the cause of tolerance, man's progress has been competitive since first he took his club from the antlers in the front hall and strode forth in search of his quarry. By bringing home the largest buck, the comeliest mate or the most scalps, he demonstrated his superiority over his neighbors, and became a man of importance in their eyes and his own. Modern man, being ordinarily denied such opportunities, must content himself with collecting chairmanships, getting elected to a legislature or a board of selectmen, or bringing home a senator to dinner.

It is in the blood of all of us, that desire, quite separate from the profit motive, to be set apart from others, to be on a higher, or at least a different plane. The bandit glories to be designated as Public Enemy No. 1. According to his lights he has been set above his fellow men, he has made the front page. Many of the workers in any noble cause are there for the personal satisfaction they derive from the attached recognition of merit. The good that they do to the hospital or other charity is a satisfaction also, but of secondary importance.

It is usually quite harmless, our glory-seeking, doing no great damage to others and affording considerable satisfaction to ourselves if we are naïve enough to be satisfied with this plaything. It is when an overwhelming ambition becomes linked with a conscienceless brutality that we have the large scale destruction of human happiness that may be accomplished by the hand of the dictator.

Harm to ourselves results when the ambition for leadership is coupled with an incapacity for that form of self-expression. Then the ground is laid for the neuroses due to frustration or, if ambitions are fulfilled, to the consciousness of an

inability to discharge the obligations that we have brought on ourselves. Happiest is the individual who is unimportant except in those activities and to those persons whom he may claim for his own!

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### POSTPARTUM HEMORRHAGE DUE TO PARTIALLY ADHERENT PLACENTA

Mrs. A. C., a thirty-year-old primipara, at term and in active labor, was referred to the hospital on April 1, 1938, by her family physician.

The family history was essentially negative, and the patient's past history was entirely negative. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted four days without pain. Her last period was June 24, 1937, making her due for delivery March 31. Her pregnancy had been normal in every way.

Physical examination revealed an obese female. Her heart was not enlarged, there were no murmurs. Her lungs were clear and resonant, there were no rales. The blood pressure was 124 systolic, 84 diastolic. The fundus was three fingers below the ensiform, with vertex presenting, in ORA position and engaged. The fetal heart was heard in the right lower quadrant at the rate of 132.

Her labor was normal up to full dilatation, and the membranes ruptured eleven and a half hours after the onset of labor. Mid-forceps was done after two hours of full dilatation because of lack of progress, and an 8 pound, 8 ounce, female child was delivered in good condition. An extensive laceration on the left and the midline episiotomy were sutured with catgut. The placenta was not delivered.

There was a moderate amount of more or less continuous bleeding after the birth of the baby. An hour after the patient was delivered the pulse became rapid and of very poor quality, and then could not be felt. Her blood pressure could not be obtained. One thousand cubic centimeters of 5 per cent glucose administered intravenously resulted in improvement. A blood pressure of 70 systolic, 50 diastolic, and a pulse of poor quality with a rate of 128 were recorded. At this time

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

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## GRADUATE MEDICAL EDUCATION

THE recent meeting in Chicago of the Council on Medical Education and Hospitals of the American Medical Association records a definite forward step in the field of graduate medical education. For years the *Journal of the American Medical Association* has been publishing information about internships in hospitals throughout the country, and more recently it has published data concerning various residencies in approved hospitals. This information has been obtained in the course of the regular survey of hospitals which the Council has conducted for many years, but no attempt has been made to appraise these various residencies.

The Council has now developed a plan of co-operation with the American Board of Radiology for the fixing of standards of approved residencies, fellowships and graduate courses, and for the investigation of such facilities by the staff of the

Council. Both organizations will co-operate in the appraisal of these graduate opportunities, and much benefit should result. It is probable that similar co-operative studies will be arranged with the other specialty boards.

There are many indications of a greater interest in graduate medical education. The arrangement at Tufts College Medical School and Boston Dispensary whereby the physicians of New England can obtain postgraduate instruction has filled a very definite need. The survey now being undertaken by the Commission on Graduate Medical Education will result in valuable information about many phases of graduate study. And this co-operative investigation by the Council and the specialty boards will make available for physicians detailed information about the opportunities for graduate training. Until the various facilities have been thoroughly surveyed and adequate opportunity afforded to comply with the standards which may be adopted, it would seem more advisable to publish a graded list of all institutions offering opportunities, as was done with medical schools at first, rather than to give merely an approved list of those institutions meeting the standards. Then after a few years have elapsed and the standards have become clarified and generally accepted, an approved list can be published. Where standards have varied greatly, or perhaps better, where definite standards have not existed, a gradual approach to the solution of the problem could well be taken, and an opportunity provided for the dissemination of knowledge about new standards and the development of means of fulfilling them. By such a program it seems reasonable to expect that this new co-operative appraisal of facilities for graduate medical study will accomplish far-reaching effects on future medical practice.

## ON THE IMPORTANCE OF BEING UNIMPORTANT

THE *March of Time*, as it flashes across the screen, reveals largely the activities of individuals sufficiently important to be flashed across the screen in the *March of Time*. A few of us on earth are sincerely and humbly valuable enough to our tel-

Dorchester	30	49	1	Methuen	5	1	0
East Boston	7	4	0	Middleboro	4	2	0
Hyde Park	7	2	0	Middleton	1	1	0
Jamaica Plain	19	20	0	Milford	5	3	1
Mattapan	3	3	1	Millbury	0	2	0
Roslindale	4	10	0	Millis	1	0	0
Roxbury	23	25	0	Mill River	0	1	0
South Boston	3	3	0	Milton	22	10	0
West Roxbury	11	11	1	Monson	0	2	0
Bourne	1	0	0	Nahant	2	0	0
Bosford	1	0	0	Nantucket	2	1	0
Boylston and West Boylston	0	1	0	Natick	3	4	0
Braintree	4	4	1	Needham	5	4	0
Brewster	0	1	0	New Bedford	37	21	2
Bridgewater and State Farm	7	3	0	Newbury	1	0	0
Brookton	28	12	0	Newburyport	5	4	0
Brookfield	2	2	0	Newton	123	47	1
Brookline	166	61	2	Norfolk	1	0	0
Cambridge	75	39	1	Northampton	20	12	0
Canton	2	2	0	Northboro	2	0	0
Carver	0	1	0	Norwell	3	0	0
Charlton	1	0	0	Norwood	6	4	0
Chatham	2	1	0	Oak Bluffs	1	0	0
Chelmsford	2	1	0	Orange	0	1	0
Chelsea	10	17	0	Orleans	0	1	0
Cheshire	1	0	0	Oxford	1	0	0
Chesterfield	1	0	0	Palmer	1	9	0
Chicopee	6	3	0	Peabody	2	9	0
Clinton	4	6	0	Pembroke	2	0	0
Cohasset	2	0	0	Pepperell	1	0	0
Concord	5	1	0	Petersham	1	0	0
Dalton	1	1	0	Pittsfield	31	8	0
Danvers	8	3	0	Plymouth	10	6	1
Dedham	9	1	1	Pocasset	0	1	0
Deerfield	0	2	0	Provincetown	1	0	0
Dennis	2	1	0	Quincy	19	18	0
Dover	1	0	0	Randolph	0	2	0
Duxbury	3	0	0	Reading	1	5	0
Easthampton	1	1	0	Revere	3	4	0
Easton (North)	2	0	0	Rockland	2	1	0
Edgartown	1	1	0	Rockport	1	1	0
Everett	6	9	0	Russell	1	0	0
Fairhaven	2	0	0	Rutland	0	7	1
Fall River	21	22	1	Salem	19	9	0
Falmouth	3	0	0	Saugus	0	5	0
Fitchburg	9	13	0	Scituate	5	1	0
Foxboro	4	1	0	Seekonk	0	1	0
Frammingham	9	5	0	Sharon	2	1	0
Franklin	3	1	0	Shelburne	1	1	0
Gardner	13	6	0	Sherborn	1	0	0
Georgetown	1	0	0	Shirley	1	0	0
Gloucester	4	5	0	Shrewsbury	3	0	0
Grafton	2	4	0	Somerset	0	1	0
Great Barrington	3	1	0	Somerville	14	23	0
Greenfield	9	5	1	Southboro	1	0	0
Groveland	1	1	0	Southbridge	2	4	0
Hadley and South Hadley	4	2	0	Southwick	0	1	0
Hamilton	0	1	0	Spencer	1	2	1
Hanover	1	1	0	Springfield	94	36	1
Hanson	0	1	2	Stockbridge	4	0	0
Harwich	2	0	0	Stoneham	3	2	0
Harwichport	0	1	0	Stoughton	0	1	0
Hatfield	1	1	0	Sudbury	2	0	0
Haverhill	9	24	1	Sunderland	1	0	0
Hingham	4	3	0	Swampscott	5	1	0
Holbrook	1	0	0	Swansea	0	1	0
Holden	0	1	1	Taunton	7	14	0
Holyoke	22	6	1	Templeton	0	1	0
Hopkinton	1	1	0	Tewksbury	2	4	1
Hudson	2	2	0	Topsfield	1	0	0
Hull	2	0	0	Turners Falls	0	3	0
Huntington	0	1	0	Tyngsboro	0	1	0
Hyannis	2	1	0	Upton	0	1	0
Indian Orchard	1	0	0	Uxbridge	4	0	0
Ipswich	3	0	0	Vineyard Haven	0	1	0
Kingston	1	2	0	Wakefield	0	13	0
Lakeville	0	0	2	Walpole	4	1	0
Lancaster	1	0	0	Waltham	22	7	0
Lawrence	25	26	3	Ware	3	2	0
Lee	1	4	0	Wareham	3	1	0
Leicester	2	1	0	Warren	1	1	0
Lenox	1	0	0	Watertown	8	8	0
Leominster	7	4	0	Wayland	3	0	0
Lexington	6	2	0	Webster	5	1	0
Lincoln	2	0	0	Wellesley	22	15	0
Littleton	2	0	0	Wellesley	0	1	0
Longmeadow	2	0	0	Westboro	7	1	0
Lowell	54	17	1	Westfield	10	3	0
Ludlow	2	0	0	Weston	2	1	0
Lunenburg	1	0	0	Westwood	4	2	0
Lynn	35	21	1	Weymouth	6	4	0
Malden	12	23	1	Whitinsville	2	2	0
Manchester	2	0	1	Whitman	2	2	0
Mansfield	5	2	0	Wilbraham (North)	1	0	0
Marblehead	7	1	1	Williamsburg	2	2	0
Marion	2	2	0	Williamstown	1	1	0
Marlboro	6	2	0	Winchendon	1	4	0
Marshfield	2	0	0	Winchester	6	5	0
Mattapoisett	1	0	0	Winthrop	4	4	0
Maynard	1	1	0	Woburn	1	8	2
Medfield	0	3	0	Worcester	100	77	4
Medford	24	11	1	Wrentham	7	2	0
Melrose	1	0	0	Yarmouth	2	1	0
Melrose	6	20	0	Out of State	99	35	5
Merrimack	0	1	0				
Total				1562 1223 63			

there was no bleeding, and because of the patient's condition and the absence of hemorrhage, it was decided that the uterus should not be invaded.

During the next several hours she was given 4000 cc of 5 per cent glucose and 800 cc of blood. Her pulse varied from time to time, sometimes it was not palpable at the wrist, and when obtained, had a rate as rapid as 150. At the end of seven hours her condition was much improved. Her blood pressure had risen to 130 systolic, 70 diastolic, but the pulse rate was still 150. It was decided that her condition then admitted exploration of the uterus. Under light nitrous oxide and oxygen anesthesia an aseptic vaginal examination was performed. The cervix admitted two fingers but was easily dilated to admit the hand. The placenta was found to be slightly adherent for about two thirds of its area. A line of cleavage was easily obtained, and the placenta completely peeled off. The uterus was not packed. Oxytocics were given, and there was no more bleeding. The patient ran a septic temperature for ten days and was discharged on the seventeenth day. The red-blood-cell count on the tenth day was 3,150,000 and the hemoglobin 50 per cent.

*Comment* Cases with a partially adherent placenta oftentimes bleed, over a continued period of time, much more than one appreciates. There is never any tremendous hemorrhage, but there is a great deal of more or less continuous bleeding until finally the patient goes into deep shock.

This patient's condition was so poor that the procrastination adopted proved to be an intelligent procedure. There was no more bleeding. The treatment for shock and the replacement of human blood improved the patient's condition so that exploration of the uterus could be done safely.

The removal of such placentas must be accomplished under the strictest asepsis. No other condition of obstetrics carries with it as great a risk of infection as does the removal of an adherent or partially adherent placenta. The sepsis in this case, fortunately not too severe, was treated purely conservatively. It is possible that intravenous injection of 2 minims of posterior pituitary extract might have resulted in the separation of this placenta, thereby doing away with the possibility of infection.

## ANNUAL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY

The annual meeting of the Massachusetts Medical Society will be held at Worcester on Tuesday, Wednesday and Thursday, June 6, 7 and 8 at the Worcester Memorial Auditorium. The annual dinner will be held on Wednesday at the Hotel Bancroft.

There is to be a definite change in the program this year in that the section meetings will be held consecutively. No two meetings will be held at the same time.

A combined clinical meeting is scheduled for Wednesday morning at which four prominent speakers will be present. In the afternoon a series of round-table discussions will be open to all members of the Society.

## LEGISLATIVE NOTES

### EXPLANATION OF THE TABULATION OF THE POSTCARD BALLOT ON THE OSTEOPATHIC BILLS AND THE ANNUAL REGISTRATION BILL

The ballots were sorted according to towns and counted through March 18 morning mail. Office addresses were given in many instances. In the case of all persons who gave Boston addresses their residences were checked by reference to the latest Directory of the Massachusetts Medical Society dated February 15, 1938, and they were allocated to the town of residence rather than the town of office. Due to recent changes subsequent to the listing there may be a very few inaccuracies in this sorting, but it is believed that any errors derived from this cause would not be systematic and would not affect the results of the ballots. The Boston cards were sorted according to districts. The cards under Boston proper contain all addresses from the Back Bay, North End, South End and West End. All other districts of Boston are sorted according to the name of the district.

The tabulation giving the vote by towns on annual registration includes the affirmative, negative and blank votes on this question. No tabulation by towns was made in regard to the votes in favor of either of the osteopathic bills or the blank votes in regard to the osteopathic bills, since the sum of these items was such a very small per cent of the total vote and there was no region from which there was any appreciable number of such votes.

TABLE 1 *Vote on Osteopathic Bills*

	FAVOR	OPPOSE	BLANK
H. 985	15	3149	65
H. 986	62	3095	10

TABLE 2 *Vote on Annual Registration*

	FAVOR	OPPOSE	BLANK
Acton	2	1	0
Adams and North Adams	9	3	0
Agawam	0	1	0
Amesbury	2	1	1
Amherst	2	3	0
Andover	7	0	0
Arlington	12	3	0
Ashburnham	0	1	0
Ashfield	0	1	0
Ashland	6	2	0
Athol	9	5	0
Attleboro and North Attleboro	0	1	0
Auburn	2	0	0
Avon	2	1	0
Ayer	3	2	0
Barnstable	0	1	0
Barre	1	0	0
Becket	2	1	0
Bedford	2	1	0
Belchertown	33	16	0
Belmont	8	4	0
Beverly	0	-	1
Billerica			
Boston			
Boston proper	115	67	15
Allston	4	1	0
Brighton	17	11	0
Charlestown	2	1	0



Franklin, Charles Eliot Ware Memorial Fellowship to Henry S. Fuller, 2M, of Washington, District of Columbia, George Cheyne Shattuck Memorial Fellowship to Bernard German, 3M, of Newark, New Jersey, James Jackson Cabot Fellowship and John Foster Award to Hubert W. Smith, 2M, of Dallas, Texas. John White Browne Scholarship to Franz J. Ingelfinger, M.D. 36, of Swampscott, Dr. William Hunter Workman Scholarships to Lewis Dexter, M.D. 36, of Cambridge, and Lewis W. Kane, 4M, of Woonsocket, Rhode Island.

Dr. Otakar J. Pollak has been appointed professor of bacteriology, pathology and immunology at the Middlesex University School of Medicine. He holds the degrees of Doctor of Medicine and Doctor of Science from Masaryk University where for four years he taught pathology. In Czechoslovakia he is licensed as a specialist and a sworn court expert in the fields of bacteriology, serology, pathology, histology, hematology, biochemistry, hormone research, assimilation and electrocardiography.

Other new members of the faculty of Middlesex University School of Medicine are Dr. Francis W. Hooper, of Westwood, a graduate of Harvard College and Boston University School of Medicine, as instructor in pediatrics; Dr. George Schwartz, of 311 Commonwealth Avenue, Boston, a graduate of Tufts College Medical School and associate member of the New England Dermatological Society, as instructor of dermatology, and Dr. Hyman Shrier, of Newton, a graduate of Tufts College Medical School and a member of the New England Obstetrical and Gynecological Society, as instructor in gynecology.

The Ring Sanatorium and Hospital has announced the appointment of Dr. Curtis T. Prout as medical director to succeed Dr. Hosea W. McAdoo.

## MAINE NEWS

The York County Medical Society, under the auspices of the Committee on Graduate Education, presented a most valuable and interesting panel discussion on pneumonia at a meeting held in Scarborough on January 4. The following physicians comprised the panel: chairman, Frederick T. Hill, Waterville, history and examination; T. E. Hardy, Waterville, pathology; Julius Gottlieb, Lewiston, x-ray diagnosis; Langdon T. Thaxter, Portland, cardiac complications; E. H. Drake, Portland, surgical complications; S. A. Cobb, Sanford, medical treatment; E. R. Blaisdell, Portland. This panel discussion was repeated at the meeting of the Kennebec County Medical Society in Waterville on February 16.

The regular monthly meeting of the Penobscot County Medical Association was held Tuesday, December 20, 1938. Guests of the association were Dr. W. H. Bunker, president of the Maine Medical Association, and Dr. Channing Frothingham, president of the Massachusetts Medical Society. Dr. Frothingham conducted a medical clinic at the Eastern Maine General Hospital during the afternoon.

Following dinner at the Bangor House at 7 p. m., a group of 61 interested physicians listened to the speakers of the evening. Dr. Bunker presented some of the problems which confront the Maine medical group, and his remarks elicited long and lively discussion from the floor. Dr. Frothingham chose for his subject "Economic Problems in Medicine, stressing especially the need for concerted and co-ordinated efforts by the medical profession to meet the challenge from the laity at the present time. Some proper form of insurance was advocated by the speaker.

## RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR JANUARY, 1939

DISEASES	JAN. 1939	JAN. 1938	FIVE YEAR AVERAGE*
Anterior poliomyelitis	1	0	1
Chickenpox	1433	2196	1832
Diphtheria	22	17	39
Dog bite	509	625	520
Dysentery bacillary	20	6	2
German measles	66	57	247
Gonorrhea	380	376	487
Lobar pneumonia	619	531	757
Measles	1986	566	2708
Meningococcus meningitis	5	3	9
Mumps	771	617	878
Paratyphoid B fever	0	1	0
Scarlet fever	797	1162	1051
Syphilis	700	433	434
Tuberculosis, pulmonary	292	267	283
Tuberculosis other forms	20	38	35
Typhoid fever	8	6	5
Undulant fever	8	2	3
Whooping cough	591	598	1144

Based on figures for preceding five years.

### RARE DISEASES

*Anterior poliomyelitis* was reported from Lynn, 1, total, 1.

*Anthrax* was reported from Ludlow, 1 total, 1.  
*Diphtheria* was reported from Beverly, 1, Boston, 2, Cambridge, 1, Foxboro, 1, Lawrence, 11, Lynn, 1, Methuen, 1, Peabody, 1, Woburn, 1, Worcester, 2, total, 22.

*Dysentery bacillary* was reported from Danvers, 12, Fall River, 1, Foxboro, 1, Holyoke, 1, Wellesley, 2, Wrentham, 3, total, 20.

*Infectious encephalitis* was reported from Foxboro, 1, Springfield, 1, total, 2.

*Malaria* was reported from Springfield, 1, total, 1.

*Meningococcus meningitis* was reported from Arlington, 1, Belmont, 1, Cambridge, 1, Lexington, 1, West Auburn, 1, total, 5.

*Pfeiffer bacillus meningitis* was reported from Attleboro, 1, Brockton, 2, Salem, 1, total, 4.

*Septic sore throat* was reported from Beverly, 1, Boston, 3, Falmouth, 1, Fall River, 1, Gardner, 2, Lawrence, 3, total, 11.

*Tetanus* was reported from Fall River, 1, total, 1.

*Trachoma* was reported from Cambridge, 1, Lawrence, 1, Malden, 1, total, 3.

*Trichinosis* was reported from Medford, 3, total, 3.

*Typhoid fever* was reported from Acushnet, 1, Boston, 1, Greenfield, 1, Longmeadow, 1, Ludlow, 1, Milford, 1, Somerville, 1, Watertown, 1, total, 8.

*Undulant fever* was reported from Gardner, 1, Grafton, 1, Leominster, 1, Leverett, 1, Salem, 1, Sharon, 1, Townsend, 1, West Springfield, 1, total, 8.

Anterior poliomyelitis continued to show low incidence.

Measles, German measles, scarlet fever, chickenpox and diphtheria were reported below the five year average.

Pulmonary tuberculosis was reported at a record low figure for the second consecutive month.

Lobar pneumonia, whooping cough, mumps and meningococcus meningitis were reported below the five year average.

Tuberculosis (other forms) showed record low figures.

Undulant fever was reported at a record high figure.

Typhoid fever was reported above the five year average.

Animal rabies showed record low incidence for the second consecutive month. Cases were reported from Bedford, Marblehead, and Wayland.

## MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 27

### BARNSTABLE

Sunday, April 2, at 4 00 p m., at the Cape Cod Hospital, Hyannis Subject—Cesarean Section, Anesthesia Instructor Robert L DeNormandie Donald E Higgins, *Chairman*

### BERKSHIRE

Thursday, March 30, at 4 30 p m., at the House of Mercy Hospital, Pittsfield Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor Rudolph Jacoby Melvin H Walker, Jr, *Chairman*

### BRISTOL NORTH

Thursday, March 30, at 4 00 p m., at the Morton Hospital, Taunton Subject—Bleeding in the Third Trimester of Pregnancy Instructor Raymond S Titus Lester E Butler, *Chairman*

### BRISTOL SOUTH (Fall River Section)

Tuesday, March 28, at 4 00 p m., at the Union Hospital, Fall River Subject—The Control and Treatment of Respiratory Infections (This is to include the serological treatment of pneumonia in infants and children) Instructor Charles F McKhann Howard P Sawyer, *Chairman*

### FRANKLIN

Wednesday, March 29, at 8 00 p m., at the Franklin County Public Hospital, Greenfield Subject—Bright's Disease and Hypertension Evaluation of new therapy, diagnosis Instructor Robert S Palmer Halbert G Stetson, *Chairman*

### HAMPDEN

Thursday, March 30, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Out patient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—The Indications and Contraindications for Removal of Tonsils and Adenoids Instructor Louis K Diamond. George L. Schadt, *Chairman*

### MIDDLESEX EAST

Tuesday, March 28, at 4 00 p m., at the Melrose Hospital (Colby Hall), Melrose. Subject—Heart Disease "The treatment of 'heart attacks' or cardiovascular emergencies" Instructor Wilfrid J Comeau Walter H Flanders, *Chairman*

### MIDDLESEX NORTH

Thursday, March 30, at 4 30 p m., at St. John's Hospital, Lowell Subject—Anemia Modern methods in diagnosis and treatment of blood dyscrasias Instructor Chester S Keefer William S Lawler, *Chairman*

### MIDDLESEX SOUTH

Tuesday, March 28, at 4 30 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Subject—Medical Complications in Pregnancy Instructor James C Janney Alexander A Levi, *Chairman*

### SUFFOLK

Thursday, March 30, at 4 30 p m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. Subject—Gonorrhea Modern treatment. Instructor Oscar F Cox, Jr Reginald Fitz, *Chairman*

## DEATHS

MacCALLUM—WALLACE P MacCALLUM, M.D., of 290 Common Street, Belmont, died March 9 He was in his sixty second year

Dr MacCallum received his degree from Jefferson Medical College of Philadelphia in 1904 He was a former member of the Massachusetts Medical Society

His widow, a son, a daughter and two sisters survive him

STEVENS—EDMUND H. STEVENS, M.D., of 1911 Massachusetts Avenue, Cambridge, died March 14 He was in his ninety fourth year

Born at Stanstead, Province of Quebec, he received his early education in Skowhegan, Maine, where his family had moved After his graduation from Dummer Academy he entered Harvard Medical School and received his degree in 1867

Dr Stevens was surgeon on the staff of the Cambridge Hospital for twenty five years, from which position he retired in 1911 devoting his time to general practice.

He was a fellow of the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons, a member of the New England Surgical Society, the Boston Obstetrical Society and the Cambridge Medical Improvement Society

A son, Dr Horace P Stevens, a grandson and two grand daughters survive him

## NEW HAMPSHIRE MEDICAL SOCIETY

### DEATH

WEAVER—CHARLES A WEAVER, M.D., died in Manchester, New Hampshire, on March 6 He was born in Milford, July 2, 1855, and graduated from the University of Vermont in 1881 Dr Weaver practiced in Manchester and New Boston for more than fifty years and was affiliated with the State Board of Health for twenty years.

His memberships included the New Hampshire Medical Society and the American Medical Association

His widow and a sister survive him

## MISCELLANY

### NOTES

Fourteen men have been granted traveling fellowships, fellowships and scholarships, totaling \$12,050, by the Harvard Medical School, it was recently announced at Harvard University These awards, for the coming academic year, are as follows William O Moseley, Jr, traveling fellowships to Samuel Lewis, M.D. '34, of Fitchburg, Richard B Pippitt, M.D. '37, of Port Jervis, New York, and Paul C Zamecnik, M.D. '36, of Cleveland, Ohio, Jeffrey Richardson Fellowship to Sinclair H Armstrong, Jr, M.D. '37, of New York, New York, DeLamar student research fellowships to Milton Elkin, 2VI, of Dorchester, Edward S Miller, 3VI, of Sioux City, Iowa, and Herbert R Morgan, 1M, of Bell, California John Ware Memorial Fellowship to Bernard D Davis, 3VI of

## TYPE 14 THERAPEUTIC SERUM

Attention is called to the fact that the Department is now distributing serum for the treatment of pneumonias due to Type 14 in addition to those previously available without charge (Types 1, 2, 5, 7, and 8). This last addition is a rabbit serum and is not made by the Department's Antitoxin and Vaccine Laboratory but is purchased from a commercial manufacturer. Except when there is an unusual prevalence in a particular area of the State, this serum will be available only through the five laboratories noted on the accompanying list. The basic dose for infants is 40,000 units and for adults 100,000 units.

There is a considerable amount of evidence, much of which is unpublished, that serum treatment of Type 14 pneumonias will reduce both the fatality rate and the duration of illness. Pneumonia due to this type is most frequently encountered in infants and young children but is occasionally found in adults. Bullova and Gleich<sup>1</sup> report that Type 14 was the etiologic agent in 218 cases (57 per cent) from a series of 2816 cases of pneumococcal pneumonia. When the 2816 cases were analyzed by age it was found that Type 14 was responsible for 20 per cent of all pneumococcal pneumonias in infants under two years of age, 14 per cent among children two to twelve years, and 3 per cent among adults. Among those in their series not treated by serum Type 14 pneumonia was most serious in adults (32 per cent fatal), quite serious in infants under two years (161 per cent fatal) and least serious in children two to twelve years (98 per cent fatal). In Heffron's series of 185 collected cases due to this type not treated with serum (quoted by Plummer<sup>2</sup>) there were 66 deaths, a fatality rate of 35.7 per cent.

## COMPONENTS OF POOLS OF DIAGNOSTIC SERUM

All laboratories are not prepared to identify pneumococci through Type 32 and some of them (when Types 1, 2, 3, 5, 7, 8, or 14 are not present) will be reporting a pneumococcus belonging to a particular group. The types included in each of the pools of diagnostic serum are given here for reference.

## Mixture A—Types 1, 2, and 7

B—	3, 4, 5, 6, and 8
C—	9, 12, 14, 15, and 17
D—	10, 11, 13, 20, 22, and 24
E—	16, 18, 19, 21, and 28
F—	23, 25, 27, 29, 31, and 32.

The pneumococci which cannot be identified completely by local laboratories are usually sent on to the State Bacteriological Laboratory for typing. However, if the physician plans to purchase commercial serum to treat a case, in order to save valuable time the sputum should be sent to the nearest local laboratory which is prepared to identify all types.

PAUL J. JAKMAU, M.D.,

*Commissioner of Public Health*

State House  
Boston

## REFERENCES

1. Bullova J. G. M. and Gleich M. A comparison of the etiology, death rates and bacteremic incidence in the more frequent primary pneumonias of infants, children and adults. *Am J M Sc* 196.709 715 1938.
2. Plummer N. The use of serum in the treatment of the higher types of pneumonia. *J A M A* 111 694-699 1938.

## LABORATORIES FOR PNEUMOCOCCUS TYPING AND SERUM DISTRIBUTION

CITY OR TOWN	HOSPITAL OR OTHER AGENCY	SPECIMENS		
		TYPED FOR TYPES	TYPE OF	SPECIMENS ACCEPTED FROM†
		1, 2, 3, 5, 7, 8	THERAPEUTIC	
		AND 14 (PLUS POOLS A-F)	SERUM	
		EXCEPT AS INDICATED	FOR DISTRIBUTION	
Amesbury	Amesbury Hospital		*	S
Attleboro	Sturdy Memorial Hospital	1-32	1	S
Ayer	Community Memorial Hospital		1	A
Beverly	Beverly Hospital	1-32	1, 2, 5, 7, 8	A
Boston	Antitoxin and Vaccine Laboratory	No typing	1, 2, 5, 7, 8	No typing
Boston	Beth Israel Hospital		1	A
Boston	Boston City Hospital	1-32	1, 2, 5, 7, 8	A
Boston	Carney Hospital		1	H
Boston	Children's Hospital	1-32	*	S
Boston	Faulkner Hospital	1-32	1, 2, 5, 7, 8	A
Boston	Massachusetts General Hospital	1-32	1	S
Boston	Massachusetts Memorial Hospitals		1	A
Boston	New England Deaconess Hospital		1	A
Boston	New England Hospital for Women and Children		*	S
Boston	Peter Bent Brigham Hospital	1-32	1, 2, 5, 7, 8	H
Boston	State Bacteriological Laboratory	1-32	1, 2, 5, 7, 8, 14	A
Boston	St. Elizabeth's Hospital		1	A
Brockton	Board of Health Laboratory	1-32	*	A
Brockton	Brockton Hospital	1-32	1, 2, 5, 7, 8	A
Cambridge	Board of Health Laboratory		*	M
Cambridge	Cambridge City Hospital		1	M
Cambridge	Cambridge Hospital	1-32	1	A
Chelsea	Chelsea Memorial Hospital		1	S
Clinton	Clinton Hospital		1	A

\*Therapeutic serum is not available through this laboratory.

†Key to abbreviations. A = any physician. H = hospital cases only. M = any physician in municipality. S = staff members and hospital cases only.

## CORRESPONDENCE

### REGULATIONS RELATIVE TO TRANSFUSIONS

*To the Editor* At the last meeting of the Department of Public Health, on Tuesday, January 10, regulations were adopted relative to the use of blood or other tissues for purposes of transfusions, and so forth. These regulations were published in the *New England Journal of Medicine* (220:171, 1939). They were to become effective ninety days from date of passage. The date upon which they were to become effective was thus advanced in order that those who found the regulations to be unreasonable might call the fact to the Department's attention.

So many entirely reasonable requests for amendment have been received that the Department, at its meeting on March 14, voted to revoke the previously adopted regulations and to substitute the following therefor. These new regulations become effective on April 10.

PAUL J. JAKMAU, M.D.,  
*Commissioner of Public Health*

State House,  
Boston.

\* \* \*

### REGULATIONS RELATIVE TO THE USE OF BLOOD OR OTHER TISSUES FOR PURPOSES OF TRANSFUSION, ETC

(Under the provisions of the General Laws, Chapter 111, Section 6)

#### INTERPRETATION AND DEFINITION OF WORDS AND TERMS

- 1 Donor Any person whose blood, unsterilized fraction of blood or tissue, is introduced into the body of another person by transfusion or otherwise.
- 2 Recipient Any person into whose body the blood, unsterilized fraction of blood or tissue of another person is introduced by transfusion or otherwise.
- 3 Dangerous disease Any disease which has been declared by the Department of Public Health to be dangerous to the public health and which is transmissible by the introduction of the blood, unsterilized fraction of blood or tissue of the donor, into the body of the recipient.
- 4 Withdrawal of blood or tissue The withdrawal of blood or tissue from the body of the donor, whether for immediate introduction into the body of the recipient, or for deferred introduction as, for example, of banked blood or serum.
- 5 Blood test A blood test for syphilis.

#### EXAMINATION OF DONOR

No person shall introduce the blood, or any unsterilized fraction of the blood or tissue, of any donor into the body of any recipient unless said donor has never had syphilis or malaria and is free from any dangerous disease, so far as such freedom from past and present infection can be determined by the following examinations and tests:

- 1 A carefully taken history as to past or present infection with syphilis or malaria, as to possible exposure to syphilis within the preceding two months, and as to the presence of symptoms of infection with any dangerous disease, and a careful physical examination which shall consist at least of an inspection of the skin from

head to feet for any rash or eruption, of the mouth for enanthem, of the external genitalia for any lesion or scar, and the recording of the body temperature, said history to be taken and said examination to be made, by a registered physician, immediately before the withdrawal of blood or tissue.

- 2 A blood test within thirty days prior to withdrawal of blood or tissue, provided that, in the case of emergency, if no previously blood tested donor is available and a rapid blood test cannot be made, said test may be omitted, but such omission and the reason therefor shall be made known to the recipient if possible, or to the recipient's guardian or nearest relative if available.
- 3 If the blood test hereinbefore required was made more than five days prior to the withdrawal of blood or tissue, or omitted because of emergency, a specimen of blood shall be collected at the time of withdrawal of blood or tissue, for subsequent testing for syphilis.

#### 4 Exceptions

If both donor and recipient are suffering from the same disease, the infection of said donor with that disease shall not prohibit the use of said donor's blood or fraction of blood or tissue for introduction into the body of the recipient.

Nothing in these regulations shall prohibit the therapeutic use of malaria.

#### EXAMINATION OF RECIPIENT

It shall be determined by a registered physician, before introduction of the blood, unsterilized fraction of blood or tissue, of a donor into the body of the recipient, whether or not said recipient has syphilis or any other dangerous disease, so far as it can be determined by a carefully taken history, a careful physical examination, and a blood test, except that in the case of emergency if a blood test cannot be performed, a specimen of blood shall be collected before the introduction of blood or tissue, for subsequent test for syphilis.

#### THE KEEPING OF RECORDS

The name, age, sex, color, marital status and address of both donor and recipient, the type of blood test performed on the donor, the results of the tests and examinations herein required, by whom performed, the date of withdrawal of blood or tissue and of its introduction into the body of the recipient, the name of the physician who introduced it, the omission of any blood test herein required and the reason therefor, shall be entered in the permanent records of the hospital, institution, clinic or physician under whose jurisdiction the introduction of blood or tissue was performed, and in such a manner that all the said data may be readily located by reference to the recipient's medical record.

#### PNEUMOCOCCUS-TYPING AND SERUM DISTRIBUTION SERVICE

*To the Editor* The accompanying list of laboratories for pneumococcus typing and serum distribution has been revised and includes all recent changes in their status. Two columns have been added to the form used in previous lists, one to show which types each laboratory is equipped to identify and the other to note from whom each laboratory usually accepts specimens.

Additions to and changes in this list are made from time to time. Due to the high cost of the serum the number of distributing stations is kept as low as possible. At present Type-1 serum is easily available in all parts of the State and serums for certain higher types are available at strategic points throughout the State. The distribution of pneu-

mococcus-antibody solutions is restricted to those hospitals, institutions or agencies equipped to do pneumococcus typing and employing bacteriologists or laboratory technicians who have been approved by the Department of Public Health as to their familiarity with typing procedures

## NOTICES

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, March 28, in the Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance), at 8 15 p m.

#### PROGRAM

Presentation of cases

Primary Tumors of the Lung Dr Edward D Churchill.

Medical students and physicians are cordially invited to attend

ROBERT ZOLLINGER, M.D., *Secretary*

### COMBINED MEETING OF THE SUFFOLK DISTRICT MEDICAL SOCIETY AND NEW ENGLAND PEDIATRIC SOCIETY

There will be a combined meeting of the Suffolk District Medical Society and the New England Pediatric Society on Wednesday, March 29, at 8 15 p m., at the Boston Medical Library, 8 Fenway, Boston.

Dr Albert D Kaiser, of Rochester, New York, will speak on Significant Facts in the Tonsil Problem in Children. Dr Francis L. Welle will open the discussion

JOHN P. MONKS, M.D., *Secretary*  
Suffolk District Medical Society

JAMES M. BATY, M.D., *Secretary*,  
New England Pediatric Society

### FIRST ANNUAL REGIONAL CONVENTION OF THE ASSOCIATION OF MEDICAL STUDENTS

The first annual regional convention of the Association of Medical Students will be held at the Harvard Medical School, April 1, 2 and 3. Distribution of Medical Care has been selected as the general subject of the convention.

The speakers will include Dr Douglass V. Brown, Mr George St. J. Perrott and Dr Elliott P. Joslin of Boston, Dr Hugh Cabot, of Rochester, Minnesota, and Dr John P. Peters, of the Yale University School of Medicine. Dr Richard H. Overholt will present a colored motion picture entitled "Thoracic Surgery."

Clinics have been scheduled for Monday, April 3 at the Boston City and the Joseph H. Pratt Diagnostic hospitals

### LAWRENCE CANCER CLINIC

The regular Lawrence Cancer Clinic, to be held at the Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, April 4, at 10 00 a. m., will be a demonstration and teaching clinic for physicians, with Dr Chan-ning C. Simmons, of Boston, associate in surgery in the courses for graduates at Harvard Medical School surgeon-in-chief at Collis P. Huntington Memorial Hospital, member of the Cancer Commission of Harvard University, and consulting surgeon to the Massachusetts General Hospital,

present as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society

ROY V. BAKETEL, M.D.,  
CHARLES J. BURGESS, M.D.,  
JOHN J. McARDLE, M.D.,  
HARRY H. NEVERS, M.D.,  
THOMAS V. UNIC, M.D.,  
J. FORREST BURNHAM, M.D., *Chairman*

### CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Salem	April 3	Harold C. Bean
Haverhill	April 5	Arthur T. Legg
Lowell	April 7	Albert H. Brewster
Gardner	April 11	Mark H. Rogers
Springfield	April 12	Garry deN. Hough, Jr
Brockton	April 13	George W. Van Gorder
Pittsfield	April 17	Francis A. Slowick
Worcester	April 21	John W. O'Meara
Fall River	April 24	Eugene A. McCarthy
Hyannis	April 25	Paul L. Norton

### MASSACHUSETTS PSYCHIATRIC SOCIETY

The next meeting of the Massachusetts Psychiatric Society will be held at the Boston Psychopathic Hospital on Friday, March 24, at 8 00 p m.

#### PROGRAM

Localization of Cortical Lesions by Electroencephalography Dr Hallowell Davis

The Cortical Frequency Spectrum in Epilepsy Dr Fred A. Gibbs.

Some Clinical Uses of the Delta Index with Special Reference to Schizophrenia. Dr Hudson Hoagland.

Electroencephalography in a Mental Hospital Miss Pauline A. Davis

General discussion will follow

W. FRANKLIN WOOD, M.D., *Secretary*

### HOSPITAL RESEARCH COUNCIL

The next meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital on Tuesday, March 28, at 5 00 p m.

#### PROGRAM

Vitamin C Lack After Major Surgery Dr Chester M. Jones

The Determination of Serum Proteins Dr Bernard M. Jacobson

Everett	Whidden Memorial Hospital	1-32	1	A
Fall River	Fall River General Hospital		1	A
Fall River	St. Ann's Hospital		1	A
Fall River	Truesdale Hospital	1-32	1	A
Fall River	Union Hospital	1-32	1	A
Fitchburg	Burbank Hospital	1-32	1, 2, 5, 7, 8	A
Foxboro	Foxboro State Hospital		*	H
Framingham	Framingham Union Hospital	1-32	1, 2, 5, 7, 8	A
Gardner	Henry Heywood Memorial Hospital		1	A
Gloucester	Addison Gilbert Hospital	1-32	1	S
Great Barrington	Fairview Hospital		1	A
Greenfield	Franklin County Hospital	1-32	1, 2, 5, 7, 8	A
Haverhill	Hale Hospital	1-32	1, 2, 5, 7, 8, 14	A
Holyoke	Holyoke Hospital	1-32	1	S
Holyoke	Providence Hospital	1-32	1, 2, 5, 7, 8, 14	A
Hyannis	Cape Cod Hospital	1-32	1, 2, 5, 7, 8	A
Ipswich	Cable Memorial Hospital	1-32	*	A
Lawrence	Lawrence General Hospital	1-32	1	A
Leominster	Leominster Hospital		1	M
Lowell	Lowell General Hospital		1	A
Lowell	St. John's Hospital	1-32	1	A
Lowell	St. Joseph's Hospital	1-32	1, 2, 5, 7, 8	A
Lynn	Lynn Hospital	1-32	1, 2, 5, 7, 8	A
Lynn	Union Hospital		1	A
Malden	Malden Hospital	1-32	1	A
Marlborough	Marlborough Hospital		1	S
Melrose	Melrose Hospital		*	A
Middleborough	St. Luke's Hospital		1	A
Milford	Milford Hospital		1	S
Nantucket	Nantucket Cottage Hospital	1-32	1	A
Natick	Leonard Morse Hospital		1	S
New Bedford	St. Luke's Hospital	1-32	1, 2, 5, 7, 8, 14	A
Newburyport	Anna Jaques Hospital		1	S
Newton	Newton Hospital	1-32	1	A
Norfolk	Pondville State Hospital	1-32	1, 2, 5, 7, 8	A
North Adams	North Adams Hospital		1	A
Northampton	Cooley Dickinson Hospital	1-32	1	A
Northampton	Northampton State Hospital		*	H
Norwood	Norwood Hospital		1	A
Oak Bluffs	Martha's Vineyard Hospital		1	A
Palmer	Wing Memorial Hospital		1	A
Peabody	J B Thomas Hospital		1	A
Pittsfield	House of Mercy Hospital	1-32	1, 2, 5, 7, 8	A
Pittsfield	St. Luke's Hospital		1	A
Plymouth	Jordan Hospital		1	A
Pocasset	Barnstable County Sanatorium		1	A
Quincy	Quincy City Hospital	1-32	1, 2, 5, 7, 8	A
Salem	Salem Hospital	1-32	1	A
Somerville	Somerville Hospital		1	A
Southbridge	Harrington Memorial Hospital		1	A
Springfield	Mercy Hospital	1-32	1, 2, 5, 7, 8	A
Springfield	Springfield Hospital	1-32	1	A
Springfield	Wesson Memorial Hospital		1	A
Taunton	Morton Hospital	1-32	*	H
Waltham	Metropolitan State Hospital		1	A
Waltham	Waltham Hospital	1-32	1	A
Ware	Mary Lane Hospital		1	A
Webster	Webster District Hospital		1	A
Westfield	Noble Hospital	1-32	*	A
Weymouth	Weymouth Hospital		*	A
Winthrop	Winthrop Community Hospital	1-32	1	A
Worcester	St. Vincent Hospital		1	A
Worcester	Worcester City Hospital	1-32	1, 2, 5, 7, 8, 14	A
Worcester	Worcester Hahnemann Hospital		1	A
Worcester	Worcester Memorial Hospital	1-32	1	A
Worcester	Worcester State Hospital	1-32	1	H

Therapeutic serum is not available through this laboratory

†Key to abbreviations. A = any physician H = hospital cases only M = any physician in municipality S = staff members and hospital uses only

## WEDNESDAY MARCH 29

- \*9-10 a. m. Joseph H Pratt Diagnostic Hospital Hospital case presentation. Dr S J Thannhauser  
12 m. Clinicopathological conference. Children's Hospital amphitheater  
Evening Tufts College Medical School Alumni Association Hotel Somerset, Boston

## THURSDAY MARCH 30

- 8:30-9:30 a. m. Exchange visit Surgical and Orthopedic. Staffs of the Peter Bent Brigham and Children's hospitals, held this week at the Peter Bent Brigham Hospital  
9:10 a. m. Joseph H Pratt Diagnostic Hospital Recent Concepts in the Etiology of Migraine. Dr Arnold Zetlin  
3:30 p. m. Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY MARCH 31

- \*9-10 a. m. Joseph H Pratt Diagnostic Hospital Clinical Studies and Biochemistry of Virulism Dr H B Friedgood.  
10 a. m. 12:30 p. m. Tumor clinic. Boston Dispensary  
12 m. Boston Dispensary luncheon meeting of the clinical staff  
12 m. Clinical meeting of the Children's Medical Service. Massachusetts General Hospital Ether Dome.

## SATURDAY APRIL 1

- 10 a. m. 1. m. Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

Open to the medical profession.

- MARCH 24—Massachusetts Psychiatric Society Page 541  
MARCH 26—Lecture at the Faulkner Hospital Page 971 issue of December 15  
MARCH 26—Health Lecture—Quincy City Hospital. Page 563 issue of February 23  
MARCH 27—New England Heart Association. Page 493 issue of March 16.  
MARCH 27-31—American College of Physicians. Page 36 issue of July 7  
MARCH 28—Hospital Research Council Page 541  
MARCH 28—Harvard Medical Society Page 541  
MARCH 29—Combined meeting of the New England Pediatric Society and the Suffolk District Medical Society Page 541  
MARCH 29—Tufts College Medical School Alumni Association Page 542  
MARCH 30—Medical clinic, Peter Bent Brigham Hospital. Page 542  
MARCH 31—Boston Dispensary luncheon meeting of the clinical staff Page 542  
APRIL 1, 2 and 3—First Annual Regional Convention of the Association of Medical Students. Page 541  
APRIL 4—Lawrence Cancer Clinic. Page 541  
APRIL 13—Pentucket Association of Physicians 8:30 p. m. Hotel Bartlett 93 Main Street Haverhill.  
APRIL 21 and 22—New England Health Education Institute. Page 542  
MAY 7-15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29  
MAY 12 and 13—American Heart Association Page 542.  
MAY 13-16—American Board of Obstetrics and Gynecology Page 457 issue of March 9  
MAY 14-20—American Physicians Art Association. Page 404 issue of March 2  
MAY 15-19—American Medical Association St. Louis Missouri  
MAY 22, 23 and 24—American Association for the Study of Gonorrhea Page 405 issue of March 2.  
JUNE 6, 7, 8—Massachusetts Medical Society Worcester  
JUNE 17-18—Symposium on the Public Health Significance of the Virus and Bacterial Diseases. Page 125 issue of January 19  
JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8  
SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22  
SEPTEMBER 11-15—American Congress on Obstetrics and Gynecology Page 935 issue of December 8.  
SEPTEMBER 15-23—Pan Pacific Surgical Association. Page 803 issue of November 24  
FALL, 1939—Temperature Symposium Page 218 issue of February 2.

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

- APRIL 5—Addison Gilbert Hospital Gloucester Clinic at 5 p. m. Dinner at 7 p. m. Speaker: Dr Ethan Allan Brown Subject: Allergy  
MAY 10—Annual meeting Salem Country Club Peabody

## NORFOLK DISTRICT

- MARCH 5—Page 493 issue of March 16

## SUFFOLK

- MARCH 9—Joint meeting with New England Pediatric Society Page 541  
APRIL 7—Annual meeting in conjunction with Boston Medical Library at 7:15 p. m. Election of officers Program and speakers to be announced.

## WORCESTER

- APRIL 1—Page 54  
MAY 10—Worcester Country Club—annual meeting

## BOOKS RECEIVED FOR REVIEW

*Anemia in Practice Pernicious anemia* William P Murphy 344 pp Philadelphia and London W B Saunders Co., 1939 \$5.00

*Pulmonary Tuberculosis A synopsis* Jacob Segal. 150 pp New York, London, Toronto Oxford University Press, 1939 \$2.75

*Bacteria The smallest of living organisms* Ferdinand Cohn (1872) Translated by Charles S Dolley (1881) 44 pp Baltimore The Johns Hopkins Press, 1939 \$1.00

*Life's Beginning on the Earth* R. Beutner 222 pp Baltimore The Williams & Wilkins Co., 1938 \$3.00

*The New International Clinics* Original contributions clinics, and evaluated reviews of current advances in the medical arts Edited by George M. Piersol. Vol. 1, n. s. 2. 312 pp Philadelphia, Montreal and New York J B Lippincott Co, 1939 \$3.00

*Transactions of the American Gynecological Society* Edited by Richard W TeLinde. Volume 63 For the year 1938 296 pp St. Louis The C V Mosby Co, 1939

*A Treatise on the Surgical Technique of Otorhinolaryngology* Georges Portmann. Collaborators H. Retrouvey, J Despons, P Leduc and G Martnaud. Translation by Pierre Viole. 675 pp Baltimore William Wood & Co, 1939 \$12.50

*Problems of Ageing Biological and medical aspects* Edited by E. V Cowdry 758 pp Baltimore Williams & Wilkins Co, 1939 \$10.00

*Biochemistry for Medical Students* William V Thorpe. 475 pp Baltimore William Wood & Co, 1939 \$4.50

*Chemical Analysis for Medical Students Qualitative and volumetric* R. E. Illingworth. 151 pp Baltimore William Wood & Co., 1938 \$1.50

## BOOK REVIEWS

*Marihuana America's New Drug Problem A sociologic question with its basic explanation dependent on biologic and medical principles* Robert P Walton. 223 pp Philadelphia, London, Montreal, Chicago and New York J B Lippincott Co, 1938 \$3.00

Hemp—the plant and its derivatives have passed under different names according to time and place—has long been abused as a narcotic, particularly in the Orient. It is only within the past half decade, however, that its use has become a widespread menace in these United States, a menace the greater in that the drug has been employed chiefly by those hardly beyond childhood. Enough concerning marihuana has appeared in the press and in popular periodicals to excite people's fears, but it has remained for Dr Walton to attempt a critical survey of all our available knowledge, a task that has involved a combing of popular as well as scientific literature.

The result is a work which is both timely and scientific and which furnishes information that should be of material aid in efforts to discover a solution of the problem. Parents of adolescents, educators, social service workers, agents of the law and, of course, physicians, should all find in this book matters of interest and import. For those who would pursue further particular phases of the subject there are excellent bibliographies

The Evidence for Endocrine Control of Serum Amylase Activity Dr Oliver Cope.

Response of Myxedema to Iodinated Proteins Dr Jacob Lerman

HENRY K BEECHER, M.D., *Secretary*

### AMERICAN HEART ASSOCIATION

The Fourteenth Scientific Sessions of the American Heart Association will be held at the Hotel Jefferson, St. Louis, Missouri, on Friday and Saturday, May 12 and May 13

The general cardiac program will be given on Friday, and the program of the section for the study of the peripheral circulation, on Saturday

### AMERICAN BOARD OF INTERNAL MEDICINE, INC

Written examinations for certification by the American Board of Internal Medicine will be held in various sections of the United States on the third Monday in October and the third Monday in February

Formal application must be received by the secretary before August 20 for the October 16 examination, and on or before January 1 for the February 19, 1940 examination.

Application forms may be obtained from Dr William S Middleton, secretary treasurer, 1301 University Avenue, Madison, Wisconsin

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, March 30, in the amphitheater of the Peter Bent Brigham Hospital, Dr James P O'Hare will give a medical clinic Practitioners and medical students are cordially invited to attend

### NEW ENGLAND HEALTH EDUCATION INSTITUTE

The New England Health Education Institute, sponsored by the New England Health Education Association, the State Departments of Health, the State Departments of Education and the State Tuberculosis Associations of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, will be held at the Massachusetts Institute of Technology, William Barton Rogers Building, 77 Massachusetts Avenue, Cambridge, Massachusetts, on April 21 and 22

### UNITED STATES CIVIL SERVICE EXAMINATIONS

Associate Public Health Nursing Consultant, \$3,200 a Year  
Assistant Public Health Nursing Consultant, \$2,600 a Year

Applications must be on file with the United States Civil Service Commission at Washington, District of Columbia, not later than April 10

Candidates must have successfully completed a full four-year course leading to a bachelor's degree in a college or university of recognized standing, including or supplemented by at least eighteen hours in public health nursing They must have graduated subsequently to January 1, 1918, from an accredited school of nursing affiliated with a hospital having a daily average of fifty or more bed patients and they must be registered graduate nurses in a state or territory of the United States or in the District of Columbia

Associate Medical Officer, \$3,200 a Year

Applications must be on file with the United States Civil Service Commission at Washington, District of Columbia, not later than April 10

Candidates must have graduated from a medical school of recognized standing with the degree of M.D., subsequent to May 1, 1934 They must have had at least one year internship, general, or one year in a special branch. Applications will be received from persons who are now serving one-year internships They will not be certified for employment, however, until proof of satisfactory completion of one year internship is furnished to the Commission

### WORCESTER DISTRICT MEDICAL SOCIETY

The next meeting of the Worcester District Medical Society will be held at the Worcester Hahnemann Hospital on Wednesday, April 12

Dr Meredith F Campbell, professor of urology at New York University College of Medicine, will speak on 'Urogenital Diseases of Infants and Children.' Discussion will be opened by Drs E Granville Crabtree and Bancroft C Wheeler

GEORGE C TULLY, M.D., *Secretary*

### BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Friday, March 31, in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon.

#### PROGRAM

The Pathology of Sinusitis Dr Philip E Meltzer  
The Treatment of Sinusitis Dr Lyman G Richards

All interested in the subject are cordially invited to attend

ROBERT W BUCK, M.D., *President*,  
JAMES M. BATY, M.D., *Secretary*

### TUFTS COLLEGE MEDICAL SCHOOL ALUMNI ASSOCIATION

The annual meeting and dinner of the Tufts College Medical School Alumni Association will be held Wednesday evening, March 29, at the Hotel Somerset, Boston.

Changes in the medical school and progress of the medical school campaign will be discussed by President Leonard Carmichael

ALONZO K. PAINE, M.D., *President*

### SOCIETY MEETINGS AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MARCH 27

MONDAY MARCH 27  
8 15 p m New England Heart Association Beth Israel Hospital.

TUESDAY MARCH 28  
9 10 a m Joseph H Pratt Diagnostic Hospital X-ray Demonstration.  
Dr Alice Ettinger  
10 a m 12 30 p m Tumor clinic Boston Dispensary  
5 p m Hospital Research Council Ether Dome Massachusetts General Hospital  
8 15 p m Harvard Medical Society Peter Bent Brigham Hospital amphitheater (Shattuck Street entrance)



# The New England Journal of Medicine

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## CANCER OF THE OVARY\*

JOE V MEIGS, M.D.†

BOSTON

IN the *Southern Medical Journal* for February, 1937, there is an article<sup>1</sup> on cancer of the ovary, with a review of all the cases treated at the Massachusetts General Hospital from 1901 through 1931, a period of thirty-one years. Because the results of treatment of these malignant epithelial tumors of the ovary were so poor the series was brought up to 1934, a period of thirty-three years. The outlook for patients with this disease is so hopeless that it seemed pertinent to present the subject here in the hope that a greater interest could be stimulated in early diagnosis and in earlier and more radical treatment. Cancer of the cervix shows absolute curability of 24 per cent in the series at the Massachusetts General Hospital, and cancer of the breast with axillary involvement, a 25 per cent arrest for five years. In the recent Pondville series<sup>2</sup> the five-year survivals for cervical cancers have been raised to 34.5 per cent through a combined use of x-ray and radium. The five-year end results for malignant epithelial lesions of the ovary are worse than the above series, and show only 24 patients out of 147, or 16 per cent, living without demonstrable disease. Thus the seriousness of this group of tumors is easily appreciated. Yet if earlier symptoms could be interpreted and earlier diagnoses be made, the end results should be much better, for the tumors in their early stages are easily dealt with.

### MATERIAL

During the years 1901-1933 inclusive there were 147 patients with cancer of the ovary. The history of each case was carefully abstracted, the slides of each tumor were reviewed and studied, and any doubtful tumors were taken for review by the hospital pathologist, Dr. Tracy B. Mallory. If a tumor was classified as malignant on the hospital record but if this diagnosis was not confirmed on the review of the slides, it was discarded.

Presented at the annual meeting of the New England Surgical Society, Boston, October 1, 1938.

†Instructor in surgery, Harvard Medical School; visiting surgeon, Massachusetts General Hospital.

Furthermore, some patients with cystadenomas of the ovary which were believed to be benign were included in the malignant group after restudy of microscopic sections. No case was accepted for this series if the diagnosis was made on a biopsy specimen from the peritoneum unless the surgeon was certain that the lesion originated in the ovary, and no metastatic tumor of known or unknown origin was accepted. Thus all cancers of the ovary with the primary lesion in the endometrium were discarded, as well as tumors metastasizing from the stomach (Krukenberg) or intestine. There were a few patients with generalized peritoneal implantations which were called malignant in the old records, if these lesions looked benign microscopically and the patient was still living after five years, the diagnosis was regarded as incorrect and a proper one of benign papillary cystadenoma of the ovary with peritoneal implantation was substituted. All tumors of peculiar or "odd" types were excluded, such as granulosa-cell carcinomas, dysgerminomas, Brenner tumors, sarcomas, teratomas (dermoids), and so forth. If no slides were available for study, the case was excluded at once. In all, more than 250 tumors of malignant types were reviewed and all but 147 were discarded. The remaining group is a selected one, but includes as few benign and "odd" cases as is possible. The history and end result, with microscopic study of the tumor by the hospital pathologist and surgeon, should be made the ideal for reports of the end results of cancer treatment. The possibility of misinterpretation in the pathological laboratory when clinical information is not available is very great. Much more valuable information would be available from the literature if no reports were presented without a complete recheck of each case at the time the reports are made.

### EMBRYOLOGY OF THE OVARY

Because of the multiplicity of tumors that originate in the ovary, an abbreviated description of its embryology is presented.

*Clinical Laboratory Methods and Diagnosis. A textbook on laboratory procedures with their interpretation*  
R B H. Gradwohl. Second edition. 1607 pp  
St. Louis. The C V Mosby Co., 1938. \$12.50

To the above description of this book one might add that it has 492 illustrations in the text, 44 colored plates and weighs 8 pounds and 4 ounces. In the preface to the edition the author states. Of particular moment in the improvement of this book are the following: a description of the newer concepts on nephritis and nephrosis, according to the viewpoints of Fishberg, Smith, Berglund and others; amplification and simplification of the chapter on blood chemistry, with an adoption of standard modern methods and the elimination of methods no longer generally practiced. More than one hundred pages have been added to the chapter on hematology. Complete data on the theories of blood development are given. New technical measures have been set forth. The value and technical methods of blood sedimentation tests are fully described. The Schilling theory has been further elaborated. Aside from textual improvement, twenty-four full page color plates have been added—a veritable atlas of hematology.

As an uncritical assembly of unrelated topics, this book has no equal. Why any book on clinical laboratory methods should contain approximately 200 pages suitable to a textbook of bacteriology, 90 pages on postmortem examinations, tissue cutting and staining and the preparation of museum specimens, 50 pages on toxicological technique, 42 pages on the detection of crime by laboratory methods, and almost 200 pages on parasitology and tropical medicine, the reviewer is unable to state. Each of these subjects would appear to deserve a separate textbook. The section devoted to postmortem pathology and toxicological technique is inadequate. The detection of crime by laboratory methods has no connection with clinical laboratory methods. Parasitology, as treated in this volume, is more properly a division of protozoology. This last section contains extremely good photographic reproductions, but many are repetitious. In fact, the only portion of the book which is not illustrated is the index. There are a dozen or more illustrations of microscopes, innumerable pictures of common laboratory apparatus, such as a shaking machine for the manufacture of vaccines, an electric warm stage, a bottle for the collection of feces, bunsen burners, electric incubators, coverglass holders, and so forth. Why any author of a textbook of laboratory methods has to assume that the users of his book have never before seen the inside of a laboratory is beyond comprehension.

If all the repetitions, useless illustrations and non-pertinent subject matter could be eliminated and this book reduced to about one-fourth its present size, it might prove to be a convenient reference for the clinician and laboratory worker.

*Tuberculosis Among Young Women*. Edna E. Nicholson. 67 pp. New York. National Tuberculosis Association, 1938.

This important problem has finally been taken out from the realms of conjecture, guesswork and moralization and put on a sound scientific basis. The subject of the high rate of tuberculosis mortality among adolescent young women has been a favorite topic of the self-styled medical expounders and moral preachers, who found many figures in support of their pet theories as to why such a condition exists.

This study was approached in a very thorough and

scientific manner by Miss Edna E. Nicholson, and the material was first published by the National Tuberculosis Association as their Social Research Series (Nos. 1 and 4). After studying the various factors that have been enumerated as a possible cause of the increased mortality, Miss Nicholson concludes, although her ideas do not lend themselves to absolute proof, that the increased mortality rate is due to the psychic and physiologic changes that take place among young women in the adolescent age. In other words, the cause is biologic and not necessarily environmental—although environment does play a part. The deduction appears to be quite sound, as the mortality in this group has always been high.

This survey should be of very great interest to all physicians who deal with the problem of tuberculosis and all persons who have the responsibility of maintaining and caring for the health of young adolescent women.

*La Ponction Sternale. Procédé de diagnostic cytologique*  
P. Émile Weil and Suzanne Perles. 183 pp. Paris.  
Masson et Cie, 1938. 75 Fr. fr.

This short monograph on sternal puncture contains up-to-date information in regard to this procedure. There is a section describing the normal myelogram, and one portraying the pathologic myelogram. In the latter there are chapters on the leukemias, leukemoid reactions, tumors of the marrow (chloromas, myelomas, reticuloendotheliomas), metastatic tumors, the anemias, polycythemia, erythroblastosis, eosinophilia, infectious diseases, hepatomegalies, splenomegalies and adenopathies. The work contains numerous illustrations, the majority black and white drawings, and a number of colored reproductions. The latter are particularly well done. There is a long bibliography referring to papers in the French, German, Italian and American literature. There is some suspicion, however, that not all the references were actually read since there are occasional ludicrous errors in the names of the journals. On the whole, however, the work will be of value to those interested in hematology.

*The Principles and Practice of Obstetrics*. Joseph B. De Lee. Seventh edition. 1211 pp. Philadelphia and London.  
W. B. Saunders Co., 1938. \$12.00.

This seventh edition of Dr. De Lee's textbook of obstetrics is as thoroughly excellent as its predecessors. It has been completely revised and now contains 1277 illustrations, 271 of them in color. The chapters dealing with the practical application of obstetrics rightly emphasize conservatism; they have been little changed. Because nearly two-thirds of the births in the United States occur in private homes, the technique of home delivery, covering all complications, is emphasized. The chapters on the physiology of menstruation and nidation of the ovum and the blood chemistry of toxemia of pregnancy have been practically rewritten, that on obstetric analgesia and anesthesia has been brought up to date, as well as those dealing with the medical complications of obstetrics. Much space has been devoted to the mechanism of labor, and the length of the chapters on contracted pelvis illustrates the importance of this condition in Dr. De Lee's mind. He bemoans the frequent use of cesarean section for this condition and states that a better understanding of the pelvis and of the mechanism of labor in contracted pelvis would oftentimes make the operation unnecessary. The chronological appendix is still a valuable contribution. The volume now extends to 1170 pages, with a complete cross-reference index of 30 pages.

and cystic, white, yellow, hemorrhagic, and so forth. There is no way of predicting what the histological picture will be from the gross appearance of the tumor, except that the so-called pseudomucinous tumor has typical pseudomucinous epithelium, whether or not it is malignant is impossible to say. Histologically three types of epithelium were recognized—the pseudomucinous, the endometrial and a large unclassified group. The easiest type to differentiate histologically is the pseudomucinous, with its high columnar cells containing large amounts of pseudomucin. The solid pseudomucinous tumor is usually made up of masses of abnormal but yet recognizable pseudomucinous epithelium. This solid type of tumor is a rarity. Another type that grows in papillary and solid forms resembles the epithelium of the endometrium. Inasmuch as the celomic epithelium produces the covering of the ovary and the Müllerian ducts, and since these ducts give rise to the endometrium, it is not surprising to find an endometrium-like tumor. Some areas in such a tumor may not suggest endometrium, and this finding probably indicates the extremely atypical character of its growth. Tumors of the so-called unclassified type are histologically different and complex, though after long study certain types are becoming more and more familiar. Their epithelium varies from well-differentiated to very undifferentiated cell types. The most bizarre and peculiar types of cells and structure may be present. This group is one of exclusion, for if the tumor could not be classified as pseudomucinous or endometrial it was placed in the unclassified group.

The criteria of malignancy used were the evidence of atypicality of cells, the presence of mitotic figures, the invasion of the walls of cysts with growing cells, undifferentiation and, in the papillary growths, the presence of areas which if seen alone would be classified as adenocarcinoma. There was no doubt of the malignancy of the tumors included in the group under study. The end results as presented seem to justify the grouping. No doubt a few mistakes have been made, but the malignancy or benignity of a tumor was usually decided from the history and the microscopic slide, and the end result was then checked. If there was a doubt as to malignancy and if the patient was living and well without disease, this tumor was classed as benign.

Grossly the tumors were divided into the following three groups—solid, and solid and cystic, malignant papillary cystadenoma with areas of adenocarcinoma, and malignant papillary cystadenoma. These divisions are primarily clinical and the separation of the two types of malignant

papillary cystadenomas usually necessitates histological differentiation. Combining the latter two, however, makes two fairly easily separated groups. The difference in prognosis between the solid group and the cystadenoma group suggests that two groups are sufficient. The division of the cystic groups is presented because of their histological difference.

#### SOLID, AND SOLID AND CYSTIC, CARCINOMA OF THE OVARY

This group is by far the most serious. Its operability is small and the prognosis very poor. By the solid type is meant a tumor with no cysts except those caused by areas of necrosis. The solid and cystic tumors are those with thick walls invaded by cancer and with large masses of cancer tissue present inside or outside the cyst. There may be marked necrosis and liquefaction or a huge growth of carcinoma from and into the wall of a malignant cyst. The tumor may be large or small, but must have at least half the bulk made up of solid cancer tissue. These tumors grow as medullary carcinoma, adenocarcinoma or papillary adenocarcinoma. The type of cell may be any one of the three types described above. Certain cases in this group may be the result of a malignant papillary cystadenoma which has grown beyond the cyst stage into the solid stage. The preoperative diagnosis is difficult. The symptoms and physical findings are presented in Table 1. A study of the cases makes one feel that any

TABLE 1 *Summary of Clinical Data on 67 Cases with Solid Carcinomas of the Ovary*

CLINICAL DATA	PERCENTAGE OF CASES POSITIVE
Well developed and nourished	58
Pain	67
Abdominal swelling	49
Loss of weight	40
Ascites	36
Urinary symptoms	27
Duration 1 year or less before operation	64
Age 30 to 50	51
Fertility (married women)	64
Catamenia	
Regular	33
Menopause passed	51
Abnormal bleeding	30
After menopause	7

woman past the age of forty who has in either vault a hard area suggestive of an ovarian lesion must be urged to be operated on at once. There is no method of making an accurate diagnosis except by operation or perhaps by peritoneoscopy. These tumors may be accompanied by abnormal bleeding before or after the menopause. In this series 37 per cent were bilateral, and it is probable that more were or had been bilateral. It is certain that in patients with solid cancer of the ovary it is

The ovary arises as a mass of mesenchyme on the back wall of the abdominal cavity. Germinal epithelium from the pelvic or celomic epithelium surrounds this mass. The ova arise either from the hind gut or the germinal epithelium and migrate into the mass. The connective tissue surrounding the ova becomes highly specialized and forms the granulosa and thecal cells of the follicles. Thus in the depth of the gonad and from mesenchyme arise structures that can eventually become epithelial—for instance the lining of certain follicle cysts. It is possible that the primitive ova are not the ones that develop into mature ova with their surrounding follicular apparatus. It may be that new eggs arise in the germinal epithelium during adult life, find their way into the cortex of the ovary and develop there.

The gonad is probably neither ovarian nor testicular at the beginning, but its development depends on the presence of sperm or ova. If abnormal ova are present, cells that ordinarily become granulosa or thecal may become testicular or tubular (Sertoli). The gonad has also been considered as testicular at first and later cupped by ovarian tissue, the testicular tissue then atrophies and the organ becomes an ovary. Either possibility explains the presence of testicular tissue in the ovary. Thus it becomes a source of tumors of the male type.

The adrenals and the kidneys develop in close proximity to the gonad, and the possibility of the inclusion of a few cells of these organs is great. Certain peculiar tumors of the ovary suggest a source such as this. The special tumors that we recognize now point to such possible sources—granulosa cell, thecal cell, testicular, tubular, Leydig cell, and so forth. All tumors of special types are excluded from this group for the more highly specialized the tumor the less is its malignancy. In the group accepted there must be many tumors that will be defined as special tumors as our knowledge increases. Therefore it may be that many of our surviving patients were blessed with highly specialized but at present unrecognized tumors. The exclusion of such lesions would greatly alter the results.

#### SYMPTOMS AND DIAGNOSIS

Ovarian cancer often gives no symptoms until it is well advanced. Frequently increase in size of the abdomen due to tumor is considered as increasing weight and heaviness due to the age of the patient. There may be early a sense of vaginal discomfort and occasionally a slight gastrointestinal upset, but later the chief symptoms are pelvic pain and discomfort, loss of weight and urinary difficulty. Ascites is not uncommon, but it must

be remembered that a solid pelvic tumor with ascites and even hydrothorax does not indicate a hopeless prognosis, because fibromas of the ovary, benign cysts and even fibroids may be accompanied by ascites and fluid in the chest.

*Age* About half of all patients with ovarian tumors are in the age group of thirty to fifty, more in the older decade than in the younger. Ten per cent are from ten to thirty, while slightly over 40 per cent are from fifty to seventy. In the most malignant group 51 per cent fall into the thirty to fifty group, while 45 per cent were found to be between fifty and seventy. Ovarian cancer is a tumor of older women.

*Marital History* In this series 119 patients, or 81 per cent, were married, of the married women but 63 per cent had had children. This is a low incidence of fertility, as the usual figure is approximately 90 per cent. In nearly all statistical studies this finding is persistent. Lynch's<sup>3</sup> paper, written in 1936, showed that but 69 per cent of his patients had had children. These figures in a nearly comparable series of cases tend to show that non-fertility is an important factor. Therefore it is necessary to consider the possibility of some sort of congenital defect of the ovary in this group of patients, for if a congenital developmental defect were present there should be an increased chance for the growth of left-over cells and, hence, for the production of abnormal growths.

*Menstrual History* In this series of 147 patients, 48, or 33 per cent, of those still menstruating had regular menstrual periods. Eight, or 5 per cent, were irregular, 18 or 12 per cent, did not give this information in their hospital histories. Seventy-three, or 50 per cent, had had the menopause. Of those past the menopause 15, or 10 per cent, had bleeding as a symptom. Probably the ovary was still secreting enough hormone to affect the endometrium so that the bleeding occurred for physiological reasons. It is doubtful that "congestion" was responsible. It is conceivable that some of the peritoneal implants which disappear after the main tumor is removed do so because ovarian hormone stimulation has been stopped. Many reports have been made of the hormone content of ovarian cyst fluids, and certainly in many the amount of estrin present might account for endometrial changes. Abnormal bleeding after the menopause in the presence of a pelvic mass should immediately make one consider the possibility of ovarian cancer.

#### TYPES OF TUMORS GROSS AND HISTOLOGIC

The group of tumors were of all sorts—large, small, papillary, smooth-walled, cystic, solid, solid

exception in the proper management of malignant lesions of the ovary

Before making a tremendous incision in the abdominal wall in the presence of a huge ovarian tumor it is often a great question as to whether or not it is safe to tap the cyst. The figures of this study (Table 4) and the previous one<sup>1</sup> show that statistically no harm comes from rupture or from tapping a cyst. This is probably due to the small number of cases, for the spilling of the contents of a

into the two types, the patients with more malignant tumors that were bilateral fared worse than those with less malignant ones. It appears from this study that the patients with bilateral lesions had a more serious prognosis than did those with single tumors.

In our hospital figures the surgeons removed only one ovary in 30 per cent of the patients with operable solid tumors, 41 per cent of those with malignant papillary cystadenomas with adenocar-

TABLE 4 *Miscellaneous Data*

TYPE OF CANCER	ALL CASES		PER CENT RECURRENT IN OTHER OVARY	UTERINE INVOLVEMENT		ADHESIONS		CYST RUPTURED BEFORE OR DURING OPERATION	
	NO	PER CENT LIVING		PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING
Solid carcinoma	67	9	0	12	0	48	6	21	7
Malignant papillary cystadenoma	80	23	4	10	13	50	28	31	32
With adenocarcinoma	37	22	5	14	20	54	25	32	33
Without adenocarcinoma	43	23	2	7	0	47	30	30	31

papillary cyst usually spreads particles of tumor that are in the cyst fluid and this is liable to be harmful. In operating on other cancers, cutting across or spilling tumor is considered dangerous, and there is corresponding danger here. However, Hodenpyl<sup>1</sup> years ago advocated the treatment of cancer with ascitic fluid from patients suffering with malignant disease because he felt it was in some way inimical to cancer growth. It is possible that the fluid of these cysts may be an inhibitor of cancer growth. Nevertheless, it seems safer to avoid spilling and rupture if possible.

**Inoperable Growths** There were many inoperable cases in this series (Table 3), the patients were simply explored, a biopsy was taken and the incision was closed. In over a quarter of the solid-tumor group and in one seventh of the cystic group this was all that could be done. There were more patients in the former group who had a short history from onset to operation and more died in the

cinoma in the wall and 32 per cent of those with malignant papillary cystadenomas. Thus, in spite of the fact that a high percentage are bilateral

TABLE 5 *Operative Mortality and One-Year Mortality in All Cases*

TYPE OF LESION	NO OF CASES	OPERATIVE MORTALITY	ONE YEAR DEATHS
		%	%
Solid carcinoma	67	10	64
Malignant papillary cystadenoma	80	4	55
With adenocarcinoma	37	3	59
Without adenocarcinoma	43	5	56

we failed to take advantage of our knowledge of ovarian tumors. It is a matter of interest, however, to find that only 5 per cent of the patients in the more malignant cystic group came back for removal of another tumor of the ovary, and only 2 per cent of those in the less malignant group, while none returned in the solid group (Table 4). All cases have been followed carefully for some

TABLE 6 *Five Year Survivals in All Cases*

TYPE OF CANCER	ALL CASES		PSEUDOMUCINOUS		ENDOMETRIAL		UNCLASSIFIED	
	NO	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING
Solid carcinoma	67	9	5	0	16	18	79	8
Malignant papillary cystadenoma	80	23	34	76	21	12	45	26
With adenocarcinoma	37	22	2	50	2	10	51	16
Without adenocarcinoma	43	23	44	16	16	14	40	30

first year after operation, showing that this type of cancer is definitely a more serious one than the cystic type.

**Bilateral Tumors** In this series the survival rate of patients with bilateral solid tumors is below that of the entire group, but it is better in the cystic group (Table 3). Dividing the latter group

time, so this fact is certainly interesting. It is probable that we have been more lucky than wise.

#### OPERATIVE MORTALITY AND FIVE-YEAR SURVIVALS

In the solid group the operative mortality was only 10 per cent, and many of these patients were in poor condition (Table 5). In the two cystic

necessary that both ovaries, the uterus and cervix be removed if possible. No attempt should be made to conserve ovarian tissue. These tumors metastasize far and wide, and patients may return after the five-year period from operation has been passed with metastatic nodules in various parts of their bodies. X-ray treatment is of some value in prolonging the lives of patients in this group, but a cure cannot be expected.

#### MALIGNANT PAPILLARY CYSTADENOMA WITH AREAS OF ADENOCARCINOMA

The division of malignant papillary cysts into two groups has justification, for the end results show that the type with areas of adenocarcinoma is more serious than a simple malignant papillary cystadenoma. Any papillary cystic tumor that microscopically has an area that suggests

TABLE 2 Summary of Clinical Data on 80 Cases with Malignant Papillary Cystadenomas with and without Areas of Adenocarcinoma

CLINICAL DATA	PERCENTAGE OF CASES POSITIVE
Well developed and nourished	53
Pain	55
Abdominal swelling	58
Loss of weight	54
Ascites	50
Urinary symptoms	44
Duration 1 year or less before operation	56
Age 30 to 50	48
Fertility (married women)	63
Catamenia	
Regular	33
Menopause passed	48
Abnormal bleeding	20
After menopause	13

adenocarcinoma in its walls is included in this group. The pseudomucinous cysts are the least malignant and the endometrial type the most. The lesion spreads, as do the solid types, but not quite so widely and rapidly. The same type of radical surgery should be used for this tumor.

#### MALIGNANT PAPILLARY CYSTADENOMA

This tumor is not so malignant as the other two, yet its treatment is not satisfactory. Here again

TABLE 3 Type of Operation in All Cases

TYPE OF CANCER	NO OF CASES	PER CENT INOPERABLE	UNILATERAL OOPHORECTOMY		BILATERAL OOPHORECTOMY		BILATERAL TUMORS	
			PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING	PER CENT ALL CASES	PER CENT LIVING
Solid carcinoma	67	25	22	7	43	18	37	8
Malignant papillary cystadenoma	80	15	31	28	43	26	41	27
With adenocarcinoma	37	8	38	29	51	21	43	17
Without adenocarcinoma	43	21	26	27	35	33	40	41

the pseudomucinous type is the least malignant and the endometrial the most. Metastasis is not so common as it is in the other two groups, but it does occur. Great care should be taken to prevent spilling of the contents of these cysts

#### TREATMENT

The required treatment of all groups is operative, as an accurate diagnosis cannot be made without surgery, and operation should be advised early and insisted upon. The peritoneoscope should prove of inestimable value in making the diagnosis. It should be used by one accustomed to the instrument, and great care should be exercised not to perforate the growth. Just as the colposcope, the cystoscope and the proctoscope are of enormous value, so eventually may the peritoneoscope become.

Treatment should consist of radical surgery. Whenever possible both the ovaries, the uterus and the cervix should be removed. A good rule in cases of ovarian cancer is to remove as much tumor tissue as is possible, and also all the genital organs if the patient's condition permits. Because these various tumors are so apt to be bilateral, and because ovarian tumors may metastasize to the other ovary, both ovaries should be removed (Table 3). If possible a total hysterectomy should be done, for ovarian tumors can metastasize to the cervix by way of a chain of lymphatics in the uterine musculature. Certain schools advise leaving the uterus behind so that it can be used as a locus for radium therapy. Inasmuch as surgery is the best means of treatment and because the new x-ray apparatus can deliver lethal dosage into the pelvis, it is safer to remove the uterus than to leave it for subsequent radium treatment.

It is extremely important to open an ovarian tumor before finishing the operation, for papillary projections may be found within the cyst, and in these tumors papillary projections suggest malignancy. If such processes are found on the outside of the cyst it is best to adopt radical surgery and remove all the pelvic organs. If papillary projections are found in a freely movable tumor and if the patient is young and wants children, conservation is justifiable. In such cases it is important that the patient be seen at least every six

months for five years or more, because if a neoplasm can develop in one ovary the same embryonic background is probably present in the other and a tumor may develop in it. Radical surgery is the rule and conservation of ovarian tissue the

treatment lie outside the scope of this paper. The gross results obtained by radiation in about 40 per cent of all the cases of cancer of the ovary reported are shown in Table 7. An important figure is that of the radiation group of solid cancers, with 7 per cent living five years without disease. This must be contrasted with a salvage of 14 per cent in a similar group not radiated. In the malignant papillary cystadenoma group the radiated cases did better than the non-radiated ones, but in the group with adenocarcinoma in the walls of the cyst, the non-radiated cases did better than the radiated. However, there is not much to choose between a 21 per cent salvage of radiated cases in the combined group and a 23 per cent salvage of non-radiated cases. The groups were fairly comparable, there being inoperable cases in both groups, and cases in which death from cancer occurred six to fifteen years later.

It is apparent from this study, so far as it goes, that no more people are cured with radiation than without it. Up to the present time the greatest reliance should be placed on surgery. It is more hopeful, however, to view the length of life in months of these patients having radiation as compared with those not having it, and here it is clear that in the most malignant type, the solid tumors, radiation prolonged life, but in the cystic groups life was longer without it. The whole series shows that the treatment given was not of too great value. It is my belief, however, that much better results will be forthcoming, and that further analysis of this particular group, with due consideration given to the extent of disease and the amount and type of radiation, may show that radiation of ovarian cancer is of greater value than now appears. But, without picking cases, this type of therapy has not proved so valuable as we thought it would.

#### DISCUSSION

Cancer of the ovary is a very serious lesion, and the solid type rates with the very worst of all malignant tumors. The record of our hospital is not satisfactory, but it probably represents the results in the community at large. Comparable series must eliminate all questionable tumors, must rule out all special tumors and must make sure that no non-malignant papillary cystadenomas are included. This series has been carefully studied and each case accepted only after careful consideration, it presents a gloomy picture, but I believe it is a correct one.

It found early, cancer of the ovary is curable, for it is often encapsulated in the ovary and is not serious until the cyst is broken or perforated or

the tumor has grown through. Therefore early operation is essential in patients with questionable ovarian lesions. It is far better to remove a simple cyst or a fibroid because of a mistaken diagnosis than to wait to see whether a given lesion becomes malignant. The use of the peritoneoscope must be encouraged, and when it plays a more prominent part in the diagnosis of pelvic disease I believe that our figures will improve. The preservation of ovarian tissue in women with ovarian cancer or papillary cysts—benign or malignant—is serious, and if this is done in order to allow pregnancy to occur, extreme caution must be exercised in the follow-up, care being taken that a lesion does not start in the other ovary.

Tapping of cysts is probably not a sound procedure, but the figures in this paper do not prove it, in fact they suggest the contrary. It is safer to advise against tapping, but if a cyst is ruptured the surgeon should not give up hope, as he has the figures of this series of cases and Hodenpvl's<sup>4</sup> advice as precedents.

#### SUMMARY AND CONCLUSIONS

Cancer of the ovary of the solid type is a very serious neoplasm.

Cancer of the ovary of the malignant papillary cystadenoma type is about as malignant as any other epithelial growth.

Early diagnosis and methods with that in view are necessary to improve the end results of this easily operable tumor.

The use of the peritoneoscope should prove of great value in diagnosis.

Bilateral tumors are more serious than unilateral ones.

Bilateral oöphorectomy with total hysterectomy is the operation to be carried out if possible.

Postoperative mortality is low.

The rupture of cysts before and during operation and the use of the trocar cannot be proved dangerous by our end results, nevertheless, avoidance of spilling of cyst contents is advocated.

X-ray treatment to date has not proved of much curative value, but more modern methods of treatment may give greater success.

Every cystic or solid tumor of the ovary that is removed should be opened before the surgeon ends his operation, in order to rule out the presence of any suspicious papillary area.

264 Beacon Street.

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groups the mortality was 3 and 5 per cent, a fairly satisfactory result

The results of surgical treatment, including the cases that had x-ray therapy, show that in the solid and the solid and cystic group only 9 per cent of 67 patients survived five years (Table 6). In the more malignant group of papillary cysts, — that is, those with adenocarcinoma in the wall of the tumor, — 22 per cent are living, while in the malignant papillary cystadenoma group 23 per cent have survived five years. The end results according to histological classification show that the most favorable types in the solid group are those of the endometrial type, with 18 per cent living, the pseudomucinous type was the worst. Taking the two cystic types together, there are 23 per cent of 80 cases living five years. Inasmuch as many of these cysts looked fairly benign, the end

it should in any way replace surgery. Whatever can be removed surgically should be, and it should not be assumed that if all the tumor cannot be taken out roentgen-ray treatment will care for the rest. It will prolong life but will not cure cancer. The changes in tumors observed following x-ray treatment in large numbers of cancers of the cervix are most convincing. Roentgen radiation will slow up the growth of cancer deep in the pelvis, both in the gross and microscopically, but it will not cure it. The present method of treating metastatic ovarian cancer can be improved upon, for although it is necessary to treat the entire abdomen, the usual procedure is to treat only two or three fields. This treatment cannot adequately cover the entire abdominal cavity, so that unless each field is marked off and treated, certain areas are sure to be missed. It is very im-

TABLE 7 *Results of Roentgen Radiation*

TYPE OF CANCER	NO OF CASES	RADIATED		NON RADIATED		PERIOD BETWEEN OPERATION AND DEATH	
		PER CENT ALL CASES	PER CENT 5 YR SURV	PER CENT ALL CASES	PER CENT 5 YR SURV	RADIATED	NON RADIATED
						mo	mo
Solid carcinoma	67	45	7	55	14	78	167
Malignant papillary cystadenoma	80	41	21	59	23	32.6	41
With adenocarcinoma	37	46	18	54	25	27.6	34.5
Without adenocarcinoma	43	37	25	63	22	37.5	47.5

results are appalling. The unclassified and the pseudomucinous types did best, with 26 per cent in each group surviving five years, and the endometrial type did poorly, with only 12 per cent survivals.

It is well to consider the endometrial type. This tumor, like cancer of the endometrium, does not become very malignant until it has grown outside the ovary or uterus. Once free in the peritoneal cavity it is one of the most malignant of all pelvic tumors. In a series<sup>5</sup> of cases of cancer of the endometrium reported from the Pondville Hospital it was found that this tumor metastasized farther and more frequently than did cancer of the cervix and that once it was outside the body of the uterus nothing could check its growth.

The percentage of five-year survivals of malignant papillary cystadenoma of all types is 23, this is a reasonable figure for most malignant tumors. However, the survival rate for the solid types suggests that it is one of the most serious cancers of the human body.

#### ROENTGEN-RAY TREATMENT

There can be no doubt of the therapeutic value of deep radiation, whether given with a 200,000-volt or a 1,000,000-volt machine, but so far it has not been shown in any large group of cases that

portant to insist on adequate and thorough radiation if it is to be given. Perhaps better results will come following the use of high-voltage machines, but this cannot be decided as yet. X-ray treatment should be given in all cases where tumor tissue has been left behind or where there is such a possibility, and it should be given as a prophylactic treatment to those patients in whom a malignant cyst has been ruptured and its contents spilled in the abdomen. If a clean and perfect removal has been accomplished it is safe to omit radiation, but it can be given in these cases also.

The end results of cases of cancer of the ovary following radiation after surgical removal are not well known, although our group is not a large one, it was well followed and studied, and the treatment was the best that could be given at that time in the Massachusetts General Hospital. Most of the cases were treated with a 200,000-volt machine with the usual screening, amperage, and so on. The treatment varied from time to time as it has in other clinics. It is fair to assume that these patients were adequately treated so far as treatment was possible. Undoubtedly better results have been obtained from those treated in the past five years, but it is of no use to report on them at this time. The complete details of radiation



treatment lie outside the scope of this paper. The gross results obtained by radiation in about 40 per cent of all the cases of cancer of the ovary reported are shown in Table 7. An important figure is that of the radiation group of solid cancers, with 7 per cent living five years without disease. This must be contrasted with a salvage of 14 per cent in a similar group not radiated. In the malignant papillary cystadenoma group the radiated cases did better than the non-radiated ones, but in the group with adenocarcinoma in the walls of the cyst, the non-radiated cases did better than the radiated. However, there is not much to choose between a 21 per cent salvage of radiated cases in the combined group and a 23 per cent salvage of non-radiated cases. The groups were fairly comparable, there being inoperable cases in both groups, and cases in which death from cancer occurred six to fifteen years later.

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## DISCUSSION

DR OLIVER N EASTMAN, Burlington, Vermont I congratulate Dr Meigs on the thoroughness of his study and his able presentation of this important subject, which I believe has received too little consideration in recent literature

Dr Meigs has brought out the fact that the mortality is very high in ovarian malignancy This can be accounted for largely by the fact that the symptoms of ovarian malignancy are usually not in evidence until the disease is well advanced It may be stressed that ovarian tumors are not infrequent, and that the results of treatment will be better when the condition is recognized early and radical treatment instituted

A pelvic tumor the size of a fist, especially if nodular and associated with irregular bleeding or ascites, warrants surgical investigation On opening the abdomen, if a warty or papillary growth is noted on the surface of the tumor, radical surgery is indicated

The ovarian tumors removed in our hospital during the last five years numbered 300 Twelve per cent were essentially or potentially malignant There were 8 cases of papillary cyst adenocarcinoma, 4 cases of pseudomucinous cyst with malignant involvement and 1 case of malignant teratoma in a child of six The other cases were questionably malignant I believe that radical surgical intervention is the treatment of choice in all growths with papillary manifestations, regardless of the histologic characteristics It is our custom to radiate following the removal of tumors which are suggestive of malignancy

Will Dr Meigs tell us how he takes care of omentum "cakes" so frequently associated with malignant tumors of the ovary?

DR BENJAMIN H ALTON, Worcester Dr Meigs's paper is to be commended for several reasons First, it presents a large series of primary malignant epithelial tumors of the ovary from which have been sorted out those tumors which either clinically or histologically were considered benign or doubtfully malignant The second point is the method he used in classifying the tumors both grossly and microscopically A third has to do with the management of these tumors relative to lowering the mortality rate and a frank discussion of certain methods in the treatment of the primary malignant epithelial tumors of the ovary

This series includes 147 cases, the choice from more than 250 tumors of malignant types, which represents more truly the primary malignant tumors that may arise from the epithelium of the ovaries To include such tumors as embryomas, granulosa-cell tumors and a number of the cystadenocarcinomas which may be questionably malignant, and which were included in the series of cases reported by Lynch and Murphy, would lessen the value of a study of the real malignant tumors which are responsible for the large number of deaths

We have observed that the mortality rate in external cancer, such as carcinoma of the breast, lip or skin, has been materially lowered through early recognition and radical removal by surgical means, or obliteration by x-ray therapy

With reference to the early recognition of internal cancer, such as cancer of the ovary, Dr Meigs has emphasized certain symptoms and physical findings which are of value He has also emphasized that the age in which to suspect a malignant tumor of the ovary is between thirty and fifty, the peak being between forty and fifty The relation of fertility to malignant disease of the ovary is extremely interesting, and in spite of the fact that 64 per cent of the patients in this group of solid carcinoma

were fertile, we cannot infer too readily that sterility is a factor in the production of cancer of the ovary

In the second group of patients, those having malignant cysts, he shows that the symptoms and physical findings are nearly parallel with those in the solid carcinoma I believe that we can suspect malignancy of the ovaries sufficiently in cases presenting the above symptoms and physical findings to justify a laparotomy I agree in principle with Dr Meigs that it is better to remove a benign tumor of the ovary in doing an exploratory laparotomy than to wait until the more classic symptoms of malignancy have developed As in carcinoma of the breast, we have learned that by the time these symptoms have developed surgical care is practically impossible I am firmly convinced that any patient between the ages of thirty and sixty presenting the symptoms mentioned demands an exploratory laparotomy, not only as a possible life saving measure but as a duty on the part of the surgeon

It is to be understood, from a pathological point of view, that there are only two ways in which a cancer of the ovary may be spread to other structures One of these is through implantation of tumor fragments, the other is via the lymphatics and blood vessels and along the fascial planes Before a papillary process or fragment of tumor can appear on the surface of an ovarian cyst, the tumor cells must have passed from the lining of the cyst through the wall and peritoneum At first, or early, they are small granular excrescences which may occur on a localized area or in blotches over the surface of the malignant cyst It seems to me that when the surface of an ovarian cyst has a grayish frosting or appears granular in blotchy areas, we should recognize that this conforms with one method of spread of the tumor cells and malignancy should be strongly suspected Not only this, but care should be exercised in handling these tumors for fear of rubbing off papillae or granules and losing them in the peritoneal cavity

Because of the possible spread of the tumor through the lymphatics, blood vessels and fascial planes, our exploration should include an examination of the mesosalpinx, the mesovarium, the round ligament and the broad ligaments If there is induration or thickening of one or more of these structures at the base of the tumor, we also know that this conforms to the spread of malignant disease and that the suspicion of cancer should be very strong I believe that when these conditions exist, the general peritoneal cavity should be walled off and the entire internal genitalia removed A metastatic nodule in the groin or lumbar lymph nodes indicates that the cancer is inoperable

It is unfortunate that we have only one tool in our armamentarium that is effective in cancer of the ovary This, as implied, is radical early surgery Late surgery is only palliative Perhaps one reason why these tumors of the ovary are less sensitive to radiation is that they are very often highly differentiated It is well known that the embryomas and other tumors less differentiated, such as the granulosa-cell tumors, are more sensitive, but even these may recur

We had at the Worcester Memorial Hospital, from 1929 to 1937 inclusive, 50 cases of primary epithelial tumors of the ovary This, of course, includes a number of benign tumors such as papillary cystadenoma and multiple cystadenoma At my request, the sections of these cases were reviewed by our pathologist, Dr James P Beck, with the idea of separating the definitely malignant tumors from this group This was done, and it was found that there were only 13 malignant tumors The criteria used in determining the malignancy were areas of adenocarcinoma in the wall of the cyst, mitotic fig

ures, undifferentiation and atypicality of cells. It is seen that, of this group, only 26 per cent of our primary tumors are malignant. This is a much smaller percentage than the 55 per cent which Dr Meigs has found in his group of 250 cases. A reason for this discrepancy may be that we separated the malignant tumors from the epithelial cysts and primary tumors which occurred in the ovary, while Dr Meigs excluded the frankly benign ones before the series was compiled.

The outstanding points which Dr Meigs has striven to make clear to us are the early recognition of carcinoma of the ovary, exploratory laparotomy and early radical surgery.

DR. JAMES R. MILLER, Hartford, Connecticut. I have been going over the material at the Hartford Hospital since 1916 and no one who has not delved into material of that kind appreciates what an enormous amount of work Dr Meigs has put together in this study.

One point that he did not touch upon, which is perhaps outside of his paper, is a reference to sarcoma of the ovary. It has been definitely shown that most of the patients with so-called sarcomas have actually had granulosa-cell tumors, and under that diagnosis have been cured of a benign lesion. We have, however, had a large number of granulosa-cell tumors which have been malignant, nevertheless, I think it is quite proper to take out all these differentiated tumors from the group of ovarian carcinomas.

DR. EDWARD H. RISLEY, Waterville, Maine. I should like to ask Dr Meigs if he will not state his attitude toward postoperative radiation of these tumors.

DR. MEIGS (closing). I believe that if the omental cake can be removed successfully and easily, and if there is no evidence of extension of the growth over the parietal peritoneum, it should be removed, or if the surgeon thinks that he has the tumor all out except that in the omentum, it ought to be removed, otherwise, I do not believe it is worth while.

To answer Dr Rusley's question about x-ray treatment, I believe that it will eventually prove to be of extreme value. Patients who have cancer of the cervix at the Pondville Hospital all have x-ray treatment before they are given radium. I have been studying the slides after that treatment, and there is no question but that this treatment changes the tumor remarkably. We have found that if tumors show radiation reaction in the stroma and in the epithelium of the cancer following x-ray, the chances of cure are good, but if the tumor shows no microscopic evidence of change, the chances are very poor.

I know that x-ray treatment can change epithelial lesions in the cervix, and therefore it ought to be used in epithelial growths in the peritoneal cavity. My objection is to the method of treatment, and I believe that roentgenologists will soon be able to deliver diffuse and wide spread radiation so as to cover most of the abdomen. The surgeon should show the radiologist where the tumor masses and their extensions are. The surgeon takes out a tumor and says there are peritoneal metastases, and the x-ray department irradiates the abdomen. It is up to us surgeons to talk the proposed treatment over with the roentgenologist and see if a method cannot be established whereby the abdomen can be more fully and completely treated. We should be able to salvage a few more of these patients.

## LIPODYSTROPHIA FACIALIS\*

### Case Report

RUBIN GURALNICK, M.D.† AND HYMAN GREEN, M.D.‡

BOSTON

IN REPORTING 6 cases of lipodystrophy Parmelee<sup>1</sup> reviews the literature extensively up to the time of his report, according to him, Coates<sup>2</sup> in 1925 summarized 63 such cases up to that year. The latter defines lipodystrophy as a disease characterized by a loss of subcutaneous fat from the face and upper portion of the body without any apparent ill health. He states that the disease affects children chiefly between the ages of five and eight, the ratio between girls and boys being 2:1. Parmelee states that the chief characteristics in his 6 cases were the thin, cadaverous facies and emaciation of the upper trunk, while the rest of the body appeared either normal or better than normal. There was no assignable cause for the malady in any of his patients, and the general health of all was very good. The children, being rather

young, displayed no abnormal mental complexes as a result of their abnormal appearance. Parmelee states that there is a multiplicity of theories to explain the local character of the fat absorption but that these only serve to emphasize the lack of knowledge as to the etiology.

Campbell<sup>3</sup> concurs with Coates in the definition of the disease as well as in its main characteristics. In his series of cases, also, girls were predominant. According to him, the loss of fat in girls is peculiarly confined to the face and trunk as far down as the iliac region, while the breasts and the region below the ilia show a well-defined hypertrophy, as though compensatory in nature. In boys, on the other hand, the characteristic loss of subcutaneous fat seems to be confined to the face only, the rest of the body remaining normal. He reiterates that the general health of the patient seems to be remarkably unaffected, and rules out the possibility of a pituitary disturbance being the etiologic factor, because of the curious limitation of the ab-

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sorption of fat to well-defined areas. It would not be possible, he argues, for the anterior portion of the pituitary body, which apparently has to do with the control of fat distribution, to be so selective in its control as to affect only certain areas of the body surface. He cites a case in which, besides the characteristic appearance peculiar to the disease, the patient exuded an abnormally strong body odor, and from this he argues that an overactivity of the sebaceous glands of the face and trunk may have something to do with the peculiar loss of fat in these parts only. To substantiate his theory, he calls attention to the fact that the sebaceous glands of the lower portion of the body are, as is well known, very inactive, and that as a result of such inactivity this part of the body is not affected in this disease.

Thannhauser<sup>4</sup> in his work on lipid diseases calls attention to Simons's disease (not to be confused with Simmond's disease), which is characterized by the localized fat absorption just described, and which Simons<sup>5</sup> himself called *lipodystrophia progressiva*. In 1911 Simons reported a number of such cases without known etiology, Meyer,<sup>6</sup> in reviewing Simons's cases, was inclined to believe that the etiology lay in a segmental trophoneurosis, although he could demonstrate no local changes in the nerves. He described a case of a woman who appeared very emaciated facially, yet whose breasts and the lower portion of whose body seemed in better condition than the average.

From this it may be seen that although the writers mentioned all agree in the general description of the disease, the etiology nevertheless remains obscure. This makes it rather a distinct entity, and on closer examination of all the facts presented, one should find no difficulty in differentiating this disease from the following:

**Simmond's disease**—a syndrome of hypophyseal cachexia with a train of symptoms quite distinct from any other disease.

**Facioscapulohumeral muscular dystrophy**—characterized by a wasting of the muscles but not of the fat tissue, and quite progressive in character.

**Progressive muscular atrophy**—differentiated along the same lines, and chiefly familial in character.

**Progeria senile**—appearance in children, together with other signs of senility which are very distinct.

**Malnutrition and cachexia**—a lack of adiposity in general, least of all in the face, the underlying cause of which can usually be easily detected.

#### CASE REPORT

D. P., an 8-year-old girl, was brought to the Out Patient Department of the Beth Israel Hospital on February 25, 1938, because of 'thinness of face.' Her present illness had begun when she was 4 years old, and it had become increasingly noticeable that her face was getting thin. This was more apparent because up to the age of 4 she was considered to be a rather plump child (Fig. 1).

Her sister could not recall any unusual illness preceding this sudden change in the child's appearance, nor was there any noticeable change in the child's behavior, habits or appetite. It was also observed that while the face was getting thin it also took on a peculiar whitish appearance. The patient's condition continued to become progressively worse for 2 years, and on the advice of the family doctor a tonsillectomy was performed. Since then there had been no further change in the facial appearance. Her appetite remained good and she got an adequate and fairly well balanced diet. Her habits were



Figure 1

good, and she generally got about 11 hours' sleep. She was active, helped with the housework and took part in the usual outdoor activities of children. She displayed no weakness on walking or during play, and got along well with her playmates. She did not seem to suffer from any complexes due to her facial appearance and was mentally alert, and her school rating was good.

The patient was the tenth of a family of eleven children. She was born at full term and of normal labor. At birth she appeared healthy and of average weight. She was breast fed for a short while, and was then put on a Dextrin Maltose milk formula. The addition of solid foods followed in due course. She had always had a sufficient amount of cod liver oil and orange juice in infancy, and so far as known her development was not out of the ordinary. She walked and talked at the expected time and was considered an average healthy child. She had had measles, chickenpox and whooping cough before she was 2 years old. She also had had a few 'slight colds.' At the age of 6 her tonsils and adenoids were removed because of her appearance, as previously stated. She entered kindergarten at the age of 4 and had been regularly promoted.

The mother died of pneumonia at 41 when the patient was a little over 1 year old. The father died 2 years previous to admission at 52, of a tumor of the stomach. One

brother died of accidental drowning, and another of pneumonia in infancy. There were no miscarriages. There were four brothers and four sisters, all apparently in good health except one brother, who was totally blind as the result of an accident. The family lived in a tenement flat cared for by the oldest sister, assisted by a state agency. The sleeping quarters were adequate and clean, and the food seemed to be adequate. There was no history of tuberculosis and none of allergic or mental disease. All the brothers and sisters were normal in weight and appearance, and there was no record of muscle dystrophy in any member of the family. The father and mother both came from Italy and married in this country, and all the children were born in or around Boston.

The patient was 49½ inches in height and weighed 60 pounds, a little above the average for her age. She was

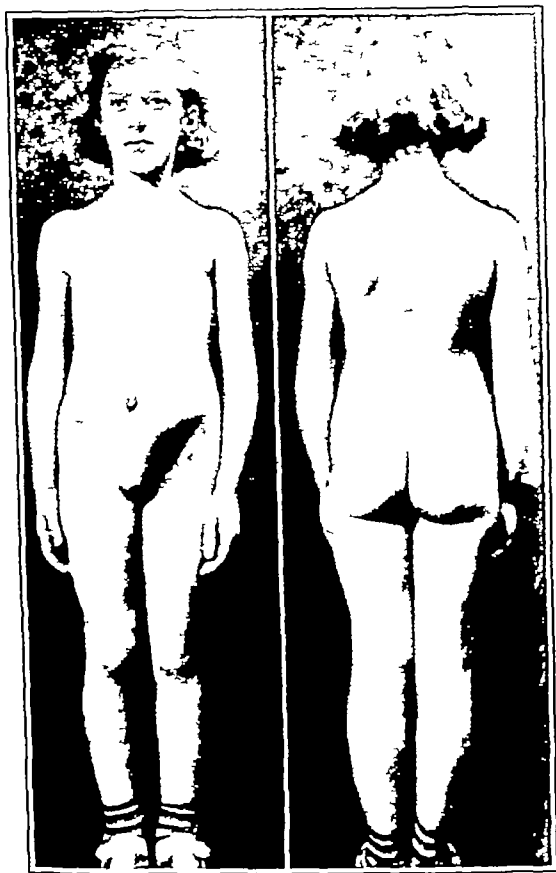


Figure 2.

bright and co-operative. The striking thing about her appearance was the drawn, thin face, with hollow cheeks and a peculiar pallid hue. The cheekbones were prominent and the skin lay in deep folds along the corners of her mouth, giving her a senile appearance. This thinness of face extended to the neck and slightly below the clavicles. On palpating the face, one was impressed by the thinness of the skin and the total absence of fat beneath it. When the patient was told to pucker her mouth the masseters stood out as small, thin bundles without any roundness of the surrounding tissue. On smiling, the skin wrinkled while the muscles around the mouth stood out grotesquely as in very debilitated old people.

The rest of the body appeared rather plump, particularly the pectoral regions and from the pelvic girdle down. The secondary sex characteristics, however, showed no precocity, and with the exception of somewhat poor dental development and slight icteric tinge of the sclera the rest of the physical examination appeared to be negative. (See Figs. 2 and 3.)

The red-cell count was 4,280,000, and the hemoglobin 75 per cent. The white-cell count was 8600, with 52 per cent polymorphonuclears, 38 per cent large lymphocytes, 8 per cent small lymphocytes, 1 per cent eosinophils and 1 per cent basophils. The achromia was 1+. The blood Wassermann and Kahn tests were negative. The blood cholesterol was 173 mg per cent and the blood calcium 10.5 mg per cent. The nonprotein nitrogen was within normal limits. The basal metabolic rate was +2 per cent. The sugar-tolerance test was as follows: fasting 74 mg, first hour 111 mg, second hour 77 mg and third hour 47 mg per cent. The urine was negative. An x-ray



Figure 3

of the skull showed no abnormalities of sutures or sella, and an x-ray of the ossification centers showed development consistent with the patient's age.

#### SUMMARY

This case of lipodystrophia facialis in an eight-year-old girl is of interest because of its comparative rarity, as well as for the ease with which it may be overlooked. As may be seen from the description of the case itself, as well as from the brief review of pertaining literature, the condition is generally characterized by a gradual disappearance of the subcutaneous fat from the face and trunk down to the pelvic region, with some hypertrophy of the fat of the rest of the body. The general health remains remarkably unaffected. The disease affects children chiefly between the ages of four and eight and usually becomes stationary at about that age. Girls are the chief victims of this peculiar disease. The etiology is

sorption of fat to well-defined areas. It would not be possible, he argues, for the anterior portion of the pituitary body, which apparently has to do with the control of fat distribution, to be so selective in its control as to affect only certain areas of the body surface. He cites a case in which, besides the characteristic appearance peculiar to the disease, the patient exuded an abnormally strong body odor, and from this he argues that an overactivity of the sebaceous glands of the face and trunk may have something to do with the peculiar loss of fat in these parts only. To substantiate his theory, he calls attention to the fact that the sebaceous glands of the lower portion of the body are, as is well known, very inactive, and that as a result of such inactivity this part of the body is not affected in this disease.

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submitted to inoculation with syphilitic blood. After the incubation period one of them developed secondary manifestations. He died in 1922.<sup>3</sup> The other two escaped infection.

In order to ascertain how blood transfusions were being performed throughout the country, Levine and Katzin<sup>4</sup> sent a questionnaire to about seven hundred hospitals. Only three hundred and fifty of these responded, and many questions were answered vaguely. An inquiry as to the percentage of cases in which a serological test for syphilis was done previous to transfusion was unanswered by one hundred and thirty-six hospitals. Ninety-one stated that such tests were regularly omitted, reliance being placed on a routine test performed about every six months. Information concerning examination of the donor was unfortunately not covered by the questionnaire. According to Rein et al.,<sup>5</sup> in 2 per cent of the hospitals in the United States donors report for a blood test only once a year. Only 3 cases of syphilis were reported among the accidents following transfusion—obviously an unbelievably small number. Rein et al. stated that the known cases of transfusion syphilis numbered 68.

Syphilis from transfusion is unquestionably a most deplorable accident. That there should be such a large number of cases, a fact which is not published but is well known, is without justification. As is true of syphilis contracted in other ways, the eradication of transfusion syphilis is impossible, but its frequency can undoubtedly be reduced to a minimum. To this end, all cases should be punctiliously reported instead of being consigned to a pious oblivion. Health authorities should give wide publicity to such cases among the members of the medical profession, and should warn them periodically of the possibility of transfusion syphilis, reminding them that even the ex-

istence of an emergency is not a valid excuse for their occurrence, since a Kline microscopic test can be done in an hour and a Hinton test in one and a half hours. Those in charge of operating rooms should be requested to keep in view and attached to transfusion apparatus reminders such as the following: "Have the donor and the recipient been given a blood test for syphilis today? Has the donor been questioned and carefully examined for syphilitic manifestations?"

Just as on the highway good brakes and proper operation of an automobile represent a very small accident hazard, so a properly performed blood transfusion should represent a minimum hazard. Accidents will happen, but they should be limited to cases where it is impossible to avoid them.

#### SUMMARY

A case of transfusion syphilis is reported, in order to stress the need of serological tests and careful examination of the donor for syphilitic manifestations immediately before every performance of blood transfusion.

The posting of warning notices in operating rooms is suggested in order to reduce the incidence of transfusion syphilis to an unavoidable minimum.

122 Waterman Street.

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unknown and the theories are conflicting and not convincing. Wasting diseases can be differentiated from it by the finding of a definite etiologic factor. Systemic treatment is of no avail. An increase in diet results only in an increase in the total avoirdupois without in any way changing the patient's appearance. The cosmetic correction of the peculiar facies by injection of paraffin into the subcutaneous tissues is not advisable because

of the danger inherent in the use of a foreign substance.

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## TRANSFUSION SYPHILIS

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THE performance of a blood transfusion without previous physical examination and a blood test for syphilis, although plenty of time in which to do them is usually available, seems to be a common practice. More than once I have questioned patients about blood tests, and have received answers such as the following: "I never had a blood test, but my blood must be all right since I gave it to a friend a few months ago." I was only typed and there was no emergency."

If this subject is brought up in private conversation among doctors, it is generally admitted that everyone knows of transfusion syphilis, but there is an evident desire to avoid having the fact become public.

The case of transfusion syphilis here reported is presented in order to call the attention of physicians to this matter. It shows what narrow escapes there may have been in the past from the accidental transmission of syphilis, in cases where reliance was placed on a donor's statement of good health or on a Wassermann test taken months before and so absolutely worthless. Klauder and Butterworth<sup>1</sup> investigated the medicolegal aspect of the subject and found that verdicts had been returned against doctors who made transfusions without previous serological tests for syphilis.

## CASE REPORT

A 13-year-old boy examined on April 6, 1938, presented a maculopapular rash consistent with secondary syphilis. His blood Wassermann reaction was 4+ with both antigens. The approximate time of onset of the rash was the 1st week of March, 1938. It was not noticed whether it appeared first on the legs or on the body. It eventually appeared on the entire body and remained evenly distributed.

According to the patient's mother he was operated on November 30, 1937. The history showed that he was in

a state of extreme cachexia, so that a fatal termination was momentarily expected. On December 2 he received an emergency blood transfusion (citrated) from a 20-year-old friend of the family. The donor's blood was typed but he was not given a physical examination. He was carrying a penile sore at the time of the transfusion. About January 1, 1938, he developed secondary manifestations of syphilis and gave a positive Wassermann reaction. He apparently never showed a rash. The chancre persisted for 6 weeks. At the end of April, 1938, he was symptom free, but still gave a positive Wassermann reaction.

The patient had a negative Wassermann reaction on December 8, 1937. His mother and father each had a negative test on April 11, 1938. Toward the end of March, previous to any antiluetic therapy, he was up and about and had gained 40 pounds in weight. The patient's rash responded quickly to treatment with neoarsphenamine, administered intravenously.

From the data given above one can hardly doubt that syphilis was transmitted with the transfusion, which had been given without questioning the donor about sexual exposure, and without giving him a physical examination or a serological test for syphilis. In this case, however, even if a Wassermann test had been done on the donor's blood it might have brought a negative response, since the donor may have been in the preserological stage of infection. Moreover, even if previous to the transfusion he had been questioned about sexual exposure he could have denied it, and on examination what remained of the chancre might have escaped observation. The only conclusion that can be reached in this case, strange though it must appear, is that a pint of fully active syphilitic blood put a dying patient on his feet.

The infectiousness of syphilitic blood was reported for the first time in 1862.<sup>2</sup> To solve the problem of the transmissibility of syphilis by the blood, then under debate, three Italian physicians



emia One had eclampsia and the remaining 9 showed albuminuria, edema, elevation of blood pressure, some retention of nonprotein nitrogen and varying grades of anemia Seven cases showed the objective signs of a disturbance in the placenta or membranes, such as vaginal bleeding and premature rupture of the membranes Three mothers

each contained areas of infarction showing acute necrosis The infant of the eclamptic mother was stillborn and the placenta showed no marked gross changes There were two areas of hemorrhage each measuring about 2 cm in diameter The microscopic changes were those of infarction and acute necrosis

TABLE 3 *Intrauterine and Extra uterine Deaths Due to Asphyxia*

CASE No	PRENATAL	CLINICAL HISTORY		SURVIVAL TIME	PLACENTA	ANATOMICAL FINDINGS	
		NATAL				INFANT	
A37 15	Toxemia	8½ mo gestation ROA birth weight 88 oz		10 hr		Atelectasis amniotic sac contents in lung associated changes of asphyxia	
A37 19	Eclampsia premature separation of placenta.	9½ mo gestation LOP birth weight 104 oz		Stillbirth	Infarction acute necrosis.	Atelectasis amniotic sac contents in lung associated changes of asphyxia	
A37 20	Toxemia vaginal bleeding premature separation of placenta	6 mo gestation LOA birth weight 44 oz		1 hr		Prematurity atelectasis amniotic sac contents in lung associated changes of asphyxia.	
A37 27	Threatened miscarriage	6 mo gestation PP birth weight 32 oz.		19 hr	Placental	Prematurity atelectasis amniotic sac contents in lung associated changes of asphyxia	
A37 28	Toxemia premature separation of placenta.	9½ mo gestation birth weight 112 oz.		Stillbirth		Atelectasis amniotic sac contents in lung associated changes of asphyxia	
A37 32	Premature rupture of membrane	7 mo gestation LOA birth weight 72 oz.		2 hr	Emboli in veins?	Prematurity atelectasis associated changes of asphyxia focal necrosis.	
A37 37	Vaginal bleeding premature separation of placenta	8 mo gestation LOP birth weight 80 oz		Stillbirth		Atelectasis amniotic sac contents in lung associated changes of asphyxia maceration	
A37 50	Toxemia	8 mo gestation birth weight 56 oz.		Stillbirth	Infarction acute necrosis	Prematurity atelectasis amniotic sac contents in lung associated changes of asphyxia maceration	
A37 53	Toxemia	7 mo gestation cesarean birth weight 64 oz.		6 hr	Normal	Prematurity atelectasis amniotic sac contents in lung associated changes of asphyxia	
A38-3	Premature separation of placenta	8 mo gestation cesarean birth weight 84 oz.		36 hr	Normal	Atelectasis amniotic sac contents in lung associated changes of asphyxia	
A38-5	Toxemia	8 mo gestation ROA birth weight 56 oz cord around neck.		Stillbirth	Deciduitis sinus thrombosis infarction acute necrosis	Prematurity atelectasis amniotic sac contents in lung associated changes of asphyxia.	
A38-9	Toxemia	7½ mo gestation breech birth weight 40 oz.		Stillbirth	Infarction acute necrosis.	Prematurity atelectasis associated changes of asphyxia maceration	
A38-13	Toxemia	7 mo gestation LOA birth weight 52 oz		3 hr	Deciduitis sinus thrombosis infarction acute necrosis.	Prematurity atelectasis associated changes of asphyxia.	
A38-16	Toxemia	7 mo gestation cesarean birth weight 52 oz.		9 hr	Placental sinus thrombosis infarction acute necrosis	Prematurity atelectasis associated changes of asphyxia	
A38-20	Premature separation of placenta	6 mo. gestation birth weight 20 oz.		15 min	Normal	Incompatible prematurity atelectasis associated changes of asphyxia	
A38-24	Premature separation of placenta	5 mo gestation birth weight 12 oz.		Stillbirth	Sinus thrombosis acute necrosis	Incompatible prematurity atelectasis associated changes of asphyxia.	

showed both toxemia and vaginal bleeding in the late prenatal period As a rule the labor was not difficult, and from the necropsy findings no evidence of trauma was discovered

Three of the mothers of stillborn infants had toxemia without vaginal bleeding, but the placenta of each showed infarctions with acute necrosis The mothers of the remaining 4 stillborn infants had vaginal bleeding before the onset of labor Only two of these placentas were examined, and

The mothers of the 2 extremely premature infants (Cases A38-20 and A38-24) presented no symptoms of toxemia, but both had vaginal bleeding and showed evidence of premature separation of the placenta One infant was liveborn, living for fifteen minutes postnatally, and the placenta showed no abnormal change, either grossly or microscopically There were 6 liveborn premature infants Three of the mothers had toxemia, 2 had vaginal bleeding and 1 had both

## DEATH IN NEWBORN AND STILLBORN INFANTS\*

JAMES S P BECK, MD†

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IN a small series of 25 cases of death in infants, varying in gestation age from five to nine months, and in which there were available the postmortem material and clinical data, it was found that the cause of death in 64 per cent was traceable to intrauterine disturbances other than those related to the fetus or to difficult delivery. This

## MATERIAL

The tissues consisted of the postmortem material accumulated in the past fourteen or fifteen months from cases admitted to the Memorial Hospital, and from others coming into the laboratory. The cases were taken in chronological order. Most of these infants were born in the hospital, so that the pre-

TABLE 1 *Deaths Due to Congenital Malformations*

CASE No	CLINICAL HISTORY		SURVIVAL TIME	ANATOMICAL FINDINGS	
	PRENATAL	NATAL		PLACENTA	INFANT
A38-6	Normal	LSA	3 hr	Cysts of amnion acute necrosis yellow infarction	Atresia of anus ureters and urethra polycystic kidneys (autopsy limited to abdomen)
A38-7	Unknown	Unknown	24 hr (?)		Situs inversus single ventricle heart, meningoencephalocele.
A38-27	Toxemia slight	LOP 2 weeks before term	72 hr		Hernia of diaphragm left hypoplasia of left lung atelectasis of right lung associated anatomy of asphyxia.

formed the largest as well as the most interesting group. The remaining 36 per cent consisted of congenital malformations incompatible with extrauterine life (12 per cent), injuries due to difficult labor (20 per cent) and syphilis (4 per cent). While the number of cases is small, the findings seem to indicate accurately where the mortality of infants of this age is generally highest.

Along with the postmortem material a study of the changes in the placentas of most of the cases has been made, and correlated with the clinical

and confinement histories were readily available. A few were admitted to the hospital from immediately outlying districts, shortly after birth. Their histories, though adequate, were brief. One of the infants having multiple congenital anomalies (Case A38-7, Table 1) was an outside case possessing medicolegal interest, the body being brought to the laboratory for postmortem examination. The small series therefore includes only postmortem cases in which the cause of death was directly associated with pregnancy and labor.

TABLE 2 *Deaths Due to Injuries Following Difficult Labor*

CASE No	CLINICAL HISTORY		SURVIVAL TIME	PLACENTA	ANATOMICAL FINDINGS	
	PRENATAL	NATAL			INFANT	
A37-26	Normal	Term forceps cord around neck	48 hr		Abrasion of skin caput atelectasis hemorrhage into gastrointestinal tract associated anatomy of asphyxia.	
A37-31	Generally contracted pelvis	Term LOP version	Stillbirth		Caput tear of falx intracranial hemorrhage atelectasis amniotic sac contents in lungs associated anatomy of asphyxia	
A38-4	Rheumatic heart disease	1 month before term ROA Scanzoni	8 days	Normal	Hemorrhage into meninges massive hemorrhage into lungs amniotic sac contents in lungs atelectasis associated anatomy of asphyxia	
A38-8	Normal	Term LOA forceps	72 hr		Abrasion of skin tear of tentorium left massive intracranial hemorrhage; atelectasis associated anatomy of asphyxia.	
A38-17	Normal	2 weeks over term LSP	48 hr	Normal	Atelectasis marked hemorrhage into lungs associated anatomy of asphyxia	

cal data of the prenatal and confinement records. This correlation has been stimulating, and has afforded a better understanding of the anatomic findings in the placentas and bodies of the infants. Deaths due to congenital anomalies and injuries sustained during difficult labor and due to specific infection‡ will not be discussed. They are summarized in Tables 1 and 2.

\*From the Pathological Laboratory of the Memorial Hospital, Worcester, Massachusetts.

†Pathologist, Memorial Hospital.

‡The single case of syphilis does not appear in the tables. The spirochetes were found in the ascitic fluid by dark field illumination and in the tissues by Levaditi's stain. The blood Hinton tests were positive.

In Table 3 are grouped the 16 cases selected for discussion. Among them are 7 stillbirths (28 per cent) and 9 liveborn infants (36 per cent) whose postnatal life averaged nine and a half hours. The shortest postnatal life was fifteen minutes in a premature infant weighing 20 ounces. The longest was thirty-six hours in an infant weighing 5 pounds, 4 ounces. Clinically there were in every case objective prenatal symptoms pointing directly to a disturbance in the placenta or to the systemic diseases characteristic of pregnancy.

Ten of the 16 mothers had some type of tox-

toxins, drugs, abnormal quantities of metabolites or alterations of the protein or mineral balance are present in the maternal blood some of the substances or alterations may be present in the fetal blood. A diminished carbon-dioxide combining power in the fetal blood (as inferred from a similar change in the maternal blood before labor) may be reflected in fetal muscular weakness and hence the respiratory efforts after birth may be weak. In the case of drugs the stimulative or depressive effect on nerve tissue is known. Hypnotics and sedatives reach the fetal blood through the placenta and may depress the respiratory center.

From the standpoint of morbid anatomy there are few lesions distinctive of such chemical injuries. Acute venous engorgement of the viscera with varying degrees of edema of the organs and tissues in general, occasional pleural and abdominal effusion, ecchymotic hemorrhages in the epicardium, pleura, thymus, meninges, peritoneum, and so forth, are the usual associated anatomical findings. Whatever the contributions to these changes are from the effects of drugs, toxins or certain injuries due to trauma, they cannot be precisely separated from those due to anoxemia. Death in utero or shortly after birth, due to asphyxia, is accompanied by anatomic changes indistinguishable from those described and defined as due to shock<sup>2</sup> experimentally produced by toxins, drugs or trauma. It is a common observation among obstetricians that those newborn infants who have "blue asphyxia" have an excellent chance of recovery, while most of those having asphyxia pallida soon expire. The latter are the ones that have the clinical outward appearance of shock and form the majority of cases for postmortem examination. There is a need for differentiative clinical laboratory data on these cases to separate clinical shock from asphyxia.

In the microscopic sections the pink-staining precipitate seen filling the alveoli of the lungs in experimental shock or asphyxia has its origin in edema fluid rich in proteins. Pink staining precipitate is regularly seen in the partially inflated alveoli of the atelectatic lungs. The origin could be from edema fluid, but when the formed elements of the amniotic sac contents are present with it, some of the precipitate is undoubtedly due to the proteins of the amniotic fluid. Regardless of its origin, this fluid in the lungs produces a mechanical embarrassment to respiration. To withstand such anatomic changes demands a factor of safety in the cardiovascular-respiratory reflex mechanism. By this is meant that in non-atelectatic lungs, where the forces of congestion and edema are applied, the work of alveoli ren-

dered functionless by the fluid is accomplished by greater work on the part of the normal alveoli through hyperpnea, orthopnea and increased pulse rate. There is little or no such factor of safety in the atelectatic lungs of the living newborn because there is no excess of ventilating space to be used for compensatory purposes. Trivial as they may seem in relation to lungs without atelectasis, such elements as small masses of mucus, amniotic sac contents or edema fluid in the respiratory passages may well cause enough obstruction in a newborn infant already suffering from asphyxia to prevent the feeble efforts of respiration from becoming effective.

While these embarrassments to the inflow of air may be a contributing cause of death, the outstanding pathological finding is the asphyxia which the infant had before birth was complete. If the anatomical parts of the respiratory mechanism are normal, it may be assumed that the obstructing elements in the bronchi and lungs are there because of a preceding asphyxia. The anatomical findings of asphyxia and amniotic sac contents in the lungs may place the onset of the abnormal changes in the period of intrauterine life. Similarly, vaginal secretion and blood in the respiratory passages may place the date at the time of delivery. Hence, the causative factor may be found in the placenta and uterus or be associated with delivery.

*Aspiration of Amniotic Sac Contents* The determination of this condition is made by a microscopic examination of the lungs. The finding of lanugo hairs, large numbers of flat cells, and particles of vernix or granules of pigment or both (presumably from meconium) in the air spaces of the lungs simply indicates that the sediment of the amniotic fluid was aspirated before the amniotic sac was emptied. The importance of such findings has been questioned by some, and by others considerable importance is attached to them if associated inflammatory changes are present in the alveoli. Opinion differs as to whether these bodies can produce inflammatory changes, and it is considered by many that the inflammatory reaction in the lungs of the newborn is suggestive of aspirated vaginal secretion, particularly if bacteria are present. It is generally believed that the presence of large amounts of the sediment in the lungs is indicative of intrauterine asphyxia.

Theoretically there are two abnormal ways in which amniotic sac contents can be forced into the fetal respiratory passages. They may be forcibly aspirated as a result of an intrauterine agonal state during asphyxia, or may be forced into the lungs during uterine contractions. The latter con-

In the 16 cases only 2 of the liveborn infants weighed 5 pounds or more. They were regarded as full-term. The mother of one had signs of premature separation of the placenta and the infant was delivered by cesarean section, the placenta was not remarkable either grossly or microscopically. The mother of the other infant had toxemia. The placenta was not examined.

#### DISCUSSION OF ANATOMICAL FINDINGS

The anatomical findings in the bodies of the 16 infants were simple, and consisted of varying degrees of prematurity, atelectasis neonatorum, and aspiration of amniotic sac contents, associated anatomical findings of asphyxia and varying degrees of maceration of body tissues.

**Prematurity** Eleven infants (44 per cent) were premature by weight and measurement, but anatomically only 2 had lungs insufficiently developed to be compatible with life without placental circulation. One of these was stillborn, the other was a liveborn infant whose postnatal life was fifteen minutes. While prematurity may have been the immediate cause of death in the infant living for fifteen minutes, it could not have been the cause of death in the stillborn, although the anatomical findings were identical. (For comparison, see Cases A38-20 and A38-24.) Also the mothers of these two infants presented similar antepartum symptoms. The difference in the two cases lies in the timing of birth and in the placentas. The placenta of the stillborn showed an extensive pathologic change.

The primary cause of death may not be found in the bodies of premature infants. The search for a causative factor in such cases regularly includes an investigation of possible anatomic changes or other conditions responsible for premature birth. The cause of certain premature births may be the same as that producing intra-uterine fetal asphyxia. The objective maternal symptoms of varying degrees of toxemia of pregnancy, vaginal bleeding or threatened miscarriage show that there were disturbances in the functioning of the uterus and placenta sufficient to cause death of the fetus either before delivery or soon thereafter.

**Atelectasis and Associated Findings of Asphyxia** Every one of the infants in this series showed atelectasis. While its extent was not estimated it was observed that (except in the 2 cases of extreme prematurity) most of the alveoli were anatomically capable of inflation, and that generally the number of alveoli partially inflated was small in those infants who lived only a few hours after birth.

Clinically the infants were living in a state of partial asphyxia, and it may be assumed that the sustained asphyxia in part was due to a persistence of atelectasis. All newborn infants have atelectasis, and are normally endowed with a mechanism for overcoming it. This mechanism has been carefully studied by Wilson and Farber,<sup>1</sup> who have shown that the force necessary for the first effective inspiration is normally greater than all later ones. If the first inspiratory efforts are for any reason inadequate to inflate the first few alveoli, atelectasis will persist, and will continue to persist so long as this force is inadequate. The force of inspiration is a function of the respiratory mechanism involving anatomically the medulla oblongata, the phrenic and thoracic nerves, the muscles of the body wall and diaphragm and the bony structure of the thorax. Chemically it is affected as are other tissues by various injurious agents, and normally it is delicately sensitive to physical and chemical changes in the blood. In order for the mechanism to function it must be anatomically possible for very definite differentials to be established between the pressure in the thorax and abdomen and that of the atmosphere. The elements of the mechanism are recalled mainly for the purpose of showing the wide field in which abnormalities, largely responsible for persistent atelectasis, may be found in the bodies of newborn infants.

The bony defects and other gross anatomic abnormalities making impossible the establishment of adequate pressure differentials are determined by inspection and are congenital malformations.

It is well known that the rhythmic action and force of respiration are dependent on a normal neuromuscular reflex component and a normal chemistry of the blood. Traumatic injuries, inflammations and tumors of the brain and cord may weaken, alter or prevent the anatomical component from functioning. Muscular fatigue from prolonged ineffective inspiratory efforts in obstructed breathing results in a loss of force. These infants, without other assistance than removing the obstruction, may not be able to overcome atelectasis. The loss of muscular power associated with a severe anoxemia at the time of birth may result in respiratory efforts too feeble to start the process of alveolar inflation.

Important data concerning the chemistry of the blood of newborn infants are frequently reported, tending to indicate that there is a relation between the chemical constituents of fetal blood and those of the maternal blood. This implies that the principles of exchange of soluble substances are the same in the placental vessels as they are in the vessels elsewhere in the body. When bacterial

simple, making their value at present uncertain. It seems apparent, however, that there is a definite relation between these lesions and the abnormal physiologic changes causing death of the fetus in selected cases. The coexistence of eclampsia or toxemia of pregnancy and premature separation of the placenta with areas of acute necrosis is an example of the changes which lead to prematurity, persistent atelectasis and death in the fetus and newborn.

The clinical application of the disturbances in fetal circulation is in the evaluation of the grade of asphyxia in terms of fetal heart rate. Richardson<sup>4</sup> has evaluated the grade of asphyxia in varying degrees of premature placental separation by means of the fetal heart rate before and during delivery. He has shown that the fetal rate is 150 to 160 when one fourth of the placenta is separated prematurely, and when half the placenta is separated the rate reaches 170 to 190. When more than half is separated the heart begins to decompensate, the rate falling to 90 or 70 in the event that three fourths of the placenta is detached. This indicates that a drop in the rate after the rate has been rapid is an unfavorable sign. While Richardson's findings were related to premature separation, they indicate a principle applicable to embarrassment of fetal circulation in general. Such conditions as a tightly knotted cord, a prolapse of the cord and extensive infarctions destroying one fourth or more of the placenta usually affect the circulation and influence the fetal heart rate in a similar manner. Since the oxygenation of fetal blood becomes a function of the lungs after birth, the grade of obstruction to the inflow of air and the degree of atelectasis may be surmised from a similar alteration in the heart tones during the early neonatal hours. If the rate is slow immediately after birth it may indicate that decompensation is already at hand and that resuscitation procedures are immediately imperative. A few precious minutes of effective treatment at such a time may save the infant's life. On the other hand, if the process of overcoming atelectasis has begun and is progressive, there generally follows clinical improvement, and a gradual lowering of the heart rate in the course of a few days.

## CONCLUSIONS

The usual anatomical findings following deaths of the fetuses in utero and liveborn infants are discussed with reference to etiology. Our finding of a close relation between death and the complications of pregnancy or labor or both is in complete harmony with a recently reported<sup>5</sup> relation involving many hundreds of similar cases. The pathogenesis of the anatomic changes is considered with respect to immediate and contributing causes of death. In the discussion a few clinical differentiative tests and observations are indirectly suggested for early recognition of the chief pathologic changes in the living newborn. It is to be assumed from the discussion that all ailing prospective mothers should be brought as near to normal health as possible before delivery is allowed to start if the welfare of the infant is the more important. The blood in anemia should be brought to normal range, in acidosis or alkalosis the carbon-dioxide combining power of the blood should be adjusted to normal, in nutritional edema the blood proteins should be raised, and the toxemias of pregnancy should be treated with great care. Mothers having a history of abortions, miscarriages, stillbirths or premature births should be given vitamins and suitable hormones in the prenatal period in order to carry the pregnancy to term. Narcotics and anesthetics seem contraindicated in mothers below par. Finally, it is to be expected that infants of such mothers will do badly immediately following birth, and that the armamentarium for immediate and effective removal of foreign materials from the respiratory passages should be ready for use. Effective means for resuscitation should be made available for immediate use during the critical period just after the cord is severed. It seems logical to cleanse the nose and throat before the cord is cut, and to use resuscitation measures afterward.

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dition appears physically unlikely if the fetus is suspended in the unruptured amniotic sac, because the increased external fluid pressure due to uterine contraction is equally distributed throughout all parts of the fetus, producing no differential in pressure and therefore no movement of fluid into the fetus. Such movement becomes possible, however, in breech or foot presentations with delivery. The nose and mouth may still be in the uterine cavity while the remainder of the infant's body is in the birth canal. Amniotic sac contents, pooled blood or mucus can then be forced into the respiratory passages during uterine contractions, because in this case the pressure of the contracting uterus is directed against the intrauterine content, squeezing the material into the nose and mouth, while the abdomen or thorax is subjected only to birth-canal pressure.

In our series about 50 per cent of the infants, both stillborn and liveborn, had amniotic sac contents in their lungs. This subject has been clearly discussed in a paper by Farber and Sweet.<sup>3</sup> They found amniotic sac contents in 88 per cent of 124 infants who lived from two hours to five weeks. In their paper the relation of the aspiration of this material to intrauterine asphyxia is shown, and the importance of such aspiration as an additional cause of respiratory embarrassment of the newborn is emphasized.

It is well, however, in this discussion to point out that such elements as small masses of mucus or aspirated amniotic sac contents, meconium, vaginal secretion or blood in the respiratory passages of newborn infants may cause a persistence of atelectasis and asphyxia in two ways. One is the mechanical embarrassment to the inflow of air to those alveoli in the field of obstruction. The other, theoretically, is the presence of interstitial edema and pleural effusion which is partly due to anoxemia.

Clinically, in the event of such obstructions, the chest may diminish in size slightly, instead of expanding, during the inspiratory phase (when the diaphragm descends and the abdomen swells owing to the force of atmospheric pressure on the non-rigid chest wall). During the expiratory phase the chest resumes its normal size as the abdomen diminishes proportionately. The chest wall is normally not so rigid immediately after birth as it is a few days later. In premature infants the rigidity is proportionately less than that in term infants, making this ineffective paradoxical breathing more noticeable. Since the negative intrathoracic pressure is most marked immediately above the diaphragm as it descends, the Litten sign is usually pronounced in cases of obstruction.

*Maceration of Body Tissue* This anatomic change is at times helpful in determining the approximate time of death before delivery of the stillborn. The degree of tissue maceration is more or less proportional to the time interval between death and delivery.

*Anatomic Changes in the Placentas* It seemed at the outset that the placentas should be examined grossly and microscopically with the same thoroughness that any surgical specimen receives. This became especially apparent when it was realized that this organ alone was acting for the lungs, gastrointestinal tract and kidneys of the individual whose body was presented for post mortem examination and whose major clinical life was spent in utero while this organ was functioning. Also, emphasis was placed on the placenta-uterus relation by such objective prenatal symptoms as toxemia of pregnancy, vaginal bleeding, threatened miscarriage, and so forth.

The anatomic changes consisted of infarctions, areas of necrosis, acute inflammatory changes in and about the villi and thromboses of maternal sinuses. Grossly the infarctions were characterized by fairly well-circumscribed yellowish or white areas, varying in size but averaging about 2 cm in diameter. Microscopically they were either masses of loose fibrin containing red cells and leukocytes, or were compact clumps of fibrillar hyaline material. Areas of necrosis are frequently associated with infarctions, resembling them in size but differing from them by having central cavitations which microscopically contain debris, leukocytes or poorly staining, partially autolyzed placental remnants. Many of these areas appear to be walled off by parallel strands of fibrin arranged in concentric fashion. Commonly a zone of compactly crowded poorly staining villi with pyknotic nuclei encircle these areas outside the wall of fibrin and leukocytes. Focal areas of necrosis may be found in the cotyledons, apparently unassociated with such infarctions and without a wall of fibrin. Sometimes the areas of necrosis consist of a mass of crowded necrotic villi seemingly held together by a coarse network of loose fibrin and leukocytes. When the villi show little necrotic change and are loosely arranged in the cotyledons, but contain neutrophils in their stroma and loose fibrin with leukocytes in the intervillous spaces, acute inflammation is implied. Inflammatory changes associated with small foci of necrosis and thrombosis of the maternal sinuses are seen in the decidua basalis. The frequency of these changes in the placenta and their relation to those found in the fetus may be seen in Table 3. These findings are few and

itself, and probably more in helping to localize the process

As soon as the results of bacteriological examination are ascertained, suitable treatment is instituted. If the organism is a streptococcus, sulfanilamide is administered. If it is a pneumococcus of the type having an antiserum, this form of therapy is given. The aftercare of these patients is of far more importance than the operative procedure. Morphine should be given in doses sufficient to relieve pain and to prevent restlessness. Adequate amounts of parenteral fluids must be given in order to combat dehydration and ketosis, but excessive amounts should be avoided on account of the danger of circulatory embarrassment. In cases calling for the use of sulfanilamide a daily or bi-daily blood examination should be made. It is common for this drug to cause a marked drop in the red-cell count and hemoglobin, which should be treated by transfusions. Abdominal distention is best relieved by Wangensteen suction and placing the patient in an oxygen tent with a high percentage of oxygen. The drain is removed when the temperature has reached normal, or a sinus tract has been definitely established, which is usually between the seventh and tenth days. This plan has not been followed for a sufficiently long time for us to feel certain of its merits, but our results so far are extremely encouraging. In 15 cases of idiopathic peritonitis treated in this manner, there were 3 deaths, a mortality of 20 per cent. Of these 15 cases, 8 were due to pneumococci and showed a mortality of 13 per cent, and 7 were due to streptococci and had a mortality of 29 per cent.

#### WILMS'S TUMOR (EMBRYOMA OF THE KIDNEY)

Embryoma of the kidney is a mixed tumor of great malignancy, of congenital origin, and usually manifests itself in the first two or three years of life. Clinically, these tumors seldom give symptoms other than the appearance of a rapidly growing mass in the region of the kidney. The general health of the infants is not affected even when the tumor has assumed enormous size. The urinary findings are only occasionally significant in showing red blood cells in the sediment and pyelograms are seldom more than suggestive of the diagnosis. The latter, however, can be correctly made, with very few exceptions, on the basis of the history and the physical examination. These tumors cause an extremely high mortality, but we believe that we have made some progress at the Children's Hospital by diverging from the common practice of other clinics.

A recent extensive review of the literature re-

veals that it has been a common practice in recent years to irradiate these tumors for a period of three to six weeks prior to performing a nephrectomy. In a recent publication on progress in urology by Colby<sup>1</sup> and in one by Kerr,<sup>2</sup> it is implied that this form of treatment is an advance. Familiarity with the results obtained by it and without it make this implication controversial. It is agreed by all observers, so far as I know, that embryomas of the kidney are extremely radiosensitive, and that they decrease in size very rapidly as a result of x-ray therapy. It is also agreed that no patient with a Wilms's tumor has ever been cured by irradiation alone. Recent careful microscopic examination of irradiated tumors shows that some cells are apparently destroyed, while some remain viable. The breaking down of tissue which results from x-ray therapy leaves viable cells in a position to be taken up more readily by the blood stream. Clinically, it is suggested that metastasis takes place earlier in patients who have received x-ray therapy than in those who have not. Furthermore, it is impossible to determine the time at which metastasis takes place or that it has not occurred during the period of regression under irradiation treatment. After a careful search in the literature last spring I was able to find reports of but 8 probable cures of embryoma of the kidney in children from other clinics. Of these, only 3 had received preoperative irradiation, while 5 had received none. When the 11 cases recently reported by the writer<sup>3</sup> are added to the 5 reported by others, it shows that in 19 cases reported as probable cures, 16 patients had received no preoperative irradiation. It would seem that until such time as x-ray therapy becomes more successful immediate operation is indicated and offers the best outlook for cure. This statement implies, of course, that the operation can be done with a low operative mortality. In the last ten years at the Children's Hospital, 30 patients with kidney embryoma have been operated on, with two operative deaths, a mortality under 7 per cent, and no patient has been regarded as inoperable on account of the size of the tumor. It is believed that the factors contributing to improved results are careful preoperative preparation, avoidance of unnecessary delay and operative technique. A transperitoneal approach is a distinct advance over the previously used posterolumbar incision. The renal pedicle and ureter are tied and cut before the kidney is mobilized. This minimizes the possibility of liberating tumor cells into the blood stream at the time of operation. Parenteral fluids and transfusion are used postoperatively when indicated.

## REPORT ON MEDICAL PROGRESS

## CHILDREN'S SURGERY

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IN THIS paper no attempt will be made to cover all the advances in children's surgery, but rather a few subjects with which it is thought the general surgeon or practitioner may be less familiar than is the surgeon giving particular attention to this age group. In some of these conditions progress has apparently been made by diverging from the usually adopted methods of procedure.

## IDIOPATHIC PERITONITIS (METASTATIC PERITONITIS)

The term idiopathic peritonitis denotes an inflammation of the peritoneum due not to a spreading infection from inflammation of the appendix or fallopian tubes or from perforation of any of the abdominal viscera, but to a blood-borne infection involving primarily the peritoneal cavity. The organisms most commonly causing this type of peritonitis are the pneumococcus and the streptococcus. This condition is almost entirely limited to children, and perhaps, for that reason, is often inappropriately handled by those of limited experience in this age group. In recent years an attempt has always been made to differentiate preoperatively peritonitis of appendiceal origin and that of the idiopathic type.

This disease is characterized by an acute onset with abdominal pain and vomiting, and sometimes there is a history of an upper respiratory infection or diarrhea. The patient shows evidences of profound toxemia, prostration, a high temperature (104 to 105°F), a rapid pulse, a high white-cell count, generalized abdominal tenderness and muscle spasm. Idiopathic peritonitis is differentiated from peritonitis of appendiceal origin in that the tenderness becomes more general earlier in the course of the disease, the temperature is higher than is usual in appendiceal peritonitis, the white-cell count is higher, and there is greater and earlier prostration.

During the last fifteen years papers have been published giving a mortality of 65 to 100 per cent in this condition. In 1926 Lipshutz and Lowenburg<sup>1</sup> reported a mortality of 100 per cent, in 1930 a series of 51 cases was reported from the Children's Hospital<sup>2</sup> in Boston with a mortality of 65 per cent, in 1934 Donovan<sup>3</sup> reported a 75 per

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cent mortality in pneumococcal peritonitis. During the period mentioned it has been a common practice to make a thorough exploration of the abdominal cavity for the origin of the peritonitis when it was found not to be the appendix. A good many years ago at the Children's Hospital it was recognized that this quest was in vain, and resulted not in the finding of the origin of the infection but in the speedy demise of the patient. We therefore adopted the policy of doing very little at the time of operation. The operation consisted solely in opening the abdomen, examining the appendix to make sure it was not the cause of the peritonitis and inserting a drain. This policy resulted in an improvement in results, so that in 1930 the mortality from both pneumococcal and streptococcal peritonitis was only 65 per cent. As a result of favorable reports on delaying the operation until such time as the localization might take place, we followed that policy for a number of years. This plan of treatment undoubtedly resulted in the saving of some lives that would have been lost by early operation. The drawback was that localization frequently failed to take place, and that many patients died during the period of delay. It must be recognized that in the child the length of the omentum relative to the size of the abdominal cavity is less than in later life, and for that reason, and perhaps on account of the greater activity of the child, localization of an inflammatory process in the peritoneal cavity takes place less frequently than in the adult. Delayed operation did not cause an improvement in our results—in fact the mortality rose to 72 per cent in a series of 54 cases. Recently we have swung back to early operation supplemented by chemical or serum therapy, as indicated. The present plan of therapy consists in making a small abdominal incision under novocain or nitrous oxide and oxygen anesthesia. As soon as the peritoneum is opened, the character of the pus and the appearance of the peritoneum make the diagnosis certain enough to allow the surgeon to avoid further exploration. Some of the pus is taken for the determination of the organism and a drain is inserted. The merits of the drain are, of course, open to argument, but from our clinical experience it is believed that it accomplishes some good in



they also resume a normal rate of physical and mental development much earlier and more completely than when they are treated by tapping and burr-hole drainage alone. It is believed that removal of the clot membrane, which is so often present, is as important as removal of the hematoma. These radical measures are often indicated in the treatment of this condition in infancy and childhood, while in the adult they would not be necessary or advisable.

#### FLUID NEEDS IN SURGICAL PATIENTS UNDER TWELVE

The maintenance of fluid balance is of paramount importance if good results are to be obtained in the surgery of this age group. The need for the administration of an adequate amount of fluid by the parenteral route is well recognized, and is even more important in the child than in the adult. There are certain difficulties in administering the proper amount to the small patient, and for this reason it is often inadequate. It must be pointed out, however, that bad as are the results from not giving enough fluids, there is danger of embarrassing the circulatory system in infants and children if too much is given by the parenteral route.

A good working rule is to make sure that the postoperative patient under six months of age receives and retains approximately 90 cc of fluid per pound every twenty-four hours. For example, an infant weighing ten pounds needs approximately 900 cc of fluid every twenty-four hours. If this infant in twenty-four hours takes and retains about 300 cc. of fluid by mouth and by rectum, approximately 600 cc must be added by the parenteral route. These figures are not absolute, but serve as a convenient and easily remembered guide. Important factors that must be considered in each case are the degree of dehydration at the time of hospitalization and the amount of daily fluid loss from vomiting, diarrhea or the use of the duodenal tube.

Saline is best administered under the skin. Normal saline is the most easily obtainable fluid and is useful, but Hartmann's solution, which is made up of sodium lactate in physiological saline, has certain advantages. The great safety factor in administering fluid under the skin is that it will not be absorbed faster than the patient can use it.

Glucose is often necessary to meet the needs of the patient. It should not be given under the skin. Glucose thus given in concentrations of 5 to 10 per cent does not result in a sufficient absorption to be of any practical value. If higher concentrations are used, there is great danger of causing a slough. Glucose may be administered by rectum but must be given slowly and in small

amounts in order to be absorbed, and the solution should never be over 10 per cent in strength.

Glucose solutions are best administered intravenously. In the infant and small child, it is often difficult to get into the vein unless proper apparatus is at hand and someone experienced in the technic of its administration is available. In giving intravenous fluids, 10 cc per pound of body weight for an infant under one year should be the maximum amount given at any one time, and even then it should be given slowly. For a patient from one to twelve years, 5 cc per pound should be the maximum amount given at any one time. The difficulty in administering intravenous fluid in this age group creates a great temptation to give a continuous intravenous drip after the manner so useful in adults. This method should be used with the utmost caution, as it is extremely difficult to avoid giving too much fluid too rapidly. If the drip is so arranged that it is slow enough so as not to embarrass the circulation, it may cease on account of thrombosis or collapse of the small vein used.

In any case where parenteral fluids are used for more than two or three days, the serum protein and the serum sodium should be determined daily. The serum protein should not go below 5.0 or 4.5 gm per cent. If it is allowed to do so, edema will surely follow. The serum sodium should not be allowed to go below 130 milliequivalents per liter. One must not wait for the dangerous clinical symptoms of right-sided heart failure or peripheral or pulmonary edema to appear. If so much fluid is given that edema and low serum protein result, wound healing is likely to be seriously interfered with.

The maintenance of adequate fluid balance is of paramount importance, but the danger of giving more fluid to these small children than they can utilize must always be borne in mind. As in the use of any form of drug therapy, an overdose may be more dangerous than an insufficient dose. Even though many patients at present probably receive less than an adequate daily amount of fluid, it is well that the dangers of overloading a small patient with fluid be emphasized.

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# SURGICAL OBLITERATION OF THE PATENT DUCTUS ARTERIOSUS

Dr Robert E Gross at the Children's Hospital has opened a new field of surgical endeavor by operations on one form of congenital heart lesion. The immediate results of these operations are extremely gratifying and the future appears to be very promising.

The ductus arteriosus normally circumvents blood around the lungs while they are collapsed during fetal life. This vessel spontaneously closes within the first few months after birth, but if it should remain open an arteriovenous type of communication is thus established, which may impair the efficiency of the cardiovascular system. This abnormality causes only minor complaints during childhood or adolescence, but in adult life it often leads to serious and fatal complications, of which subacute bacterial endocarditis or cardiac failure are the commonest.

The foundations are laid in childhood for serious disease which may not become manifest until many years later. Blood rushing from the aortic arch into the pulmonary artery produces intimal thickening about the ductal orifice and in the pulmonary artery, which may later be the seat of bacterial vegetation. The vascular leak so increases the work of the left ventricle that cardiac reserve is reduced to a point where decompensation subsequently occurs. If these hazards in adult life are to be avoided, they must be warded off in childhood before permanent and irreparable damage has been done.

Working on this rationale, Gross<sup>7</sup> has developed a technic where the patent ductus can be exposed and surgically ligated. Studying post-mortem material and practicing the operative steps on dogs, a suitable approach by way of the left pleural cavity has been found which gives an adequate exposure of the aortic arch, pulmonary artery and ductus. The feasibility of such an operation has been demonstrated by successfully exploring and ligating the ductus in 4 patients without resulting mortality. These children, aged seven, eleven, seven and seventeen years, withstood operation remarkably well and did not develop any serious complications. Following operation, all the patients showed a marked diminution in the intensity of the previously overactive heart beat. In each case the precordial thrill disappeared. The loud murmurs which were so prominent before operation were reduced to minimal ones in 2 patients, and have completely disappeared in the other 2, which were treated by placing double ligatures on the ductus. In each case the low diastolic pressure which existed before operation rose by 25 to 35 mm of mercury to a permanently normal

level. In 2 cases there was no appreciable change in the size of the heart, but in the other 2 there were diminutions in its transverse diameter of 0.5 and 1.0 cm, respectively. Calculations of the blood flow were made in 2 cases by determining oxygen concentrations of blood samples taken from the aorta, ductus and pulmonary artery before and after ligation of the ductus. These studies showed that the peripheral circulation was greatly improved after ligation of the ductus, yet the work of the heart was greatly reduced.

The success of the operative procedure depends on recognizing this condition and differentiating it from other types of congenital heart disease. Surgery has much to offer those individuals who have a patent ductus arteriosus.

## SUBDURAL HEMATOMA IN INFANTS AND CHILDREN

Ingraham and Heyl<sup>8</sup> have in the course of the past year presented reasons for a more radical treatment of subdural hematoma in infants and children. This is of particular interest in view of the present tendency among neurosurgeons to treat this condition by extremely conservative measures. This seems to be due to the fact that adults respond very satisfactorily to conservative treatment. When infants and children are seen only occasionally in a group of patients most of whom are adults there is a natural tendency to treat all patients in the same way regardless of age. The chief reason for a different treatment in the younger group is the presence in the majority of cases of a definite clot membrane. If no membrane is present, drainage of the hematoma through burr holes is satisfactory at any age. If even a thin clot membrane is present over the surface of an infant's brain, however, it interferes with growth, and may result in cortical atrophy, because of the rapid rate of normal growth of the brain. This opinion has been verified at this clinic by the study of older children who were not treated radically or were not treated at all. In the adult brain where the size is fixed, the presence of a membrane is not nearly so vital as long as the fluid portion of the clot is removed.

It is of interest to note that subdural hematoma is a much commoner condition in infancy and childhood than is ordinarily supposed. A series of patients ranging from two months to six years in age were studied, and the authors now advocate radical treatment consisting of the removal of the hematoma and the hematoma membranes whenever their presence has been demonstrated through burr holes. This necessitates turning down bone flaps, a procedure which these patients tolerate well if they are properly handled. When so treated,

history in this particular case. Fever is common, often to a fairly high degree. The other aspect which strikes me is the fact that he had so few symptoms referable to the mass itself, or to the nodes. The history records specifically the absence of chest pains, of difficulty in swallowing or difficulty in breathing. Hodgkin's disease in the mediastinum is very frequently accompanied by rather severe symptoms from pressure either on the esophagus and trachea or on the various branches of the sympathetic chain.

I do not believe that either of these diagnoses fulfills the picture as it is given here and the third diagnosis which we certainly ought to consider is that of a primary lesion of the thyroid. It is fair to assume that he had an enlarged thyroid for a period of years. He did not show signs of hyperthyroidism. His weight is said to have remained steady. There is no mention of the other usual signs and symptoms of hyperthyroidism. He did have elevation of blood pressure and that is about all that can be even faintly suggestive of hyperthyroidism. If it is not hyperthyroidism then the various tumors of the thyroid must be considered. The one tumor which seems to fit all the various findings is the tumor classed as malignant adenoma. This may appear at an early age. The initial enlargement of the thyroid may remain without much change in size over some period of years and it eventually metastasizes. When it does, it may go by direct extension or by lymphatic invasion to the cervical nodes or into the mediastinum or by extension in veins into the lungs or bone. The tumor and its metastases may both be very highly differentiated and may suggest normal thyroid tissue. It is not a rapidly progressing and debilitating process such as adenocarcinoma or papillary carcinoma of the thyroid.

There are one or two symptoms which I attempted to fit into the picture. These are two attacks which were described as a warm sensation in the chest and abdomen and a feeling of faintness. These occurred eight to nine weeks before he came to the hospital. I thought that possibly a tumor located in the superior mediastinum in relation to the sympathetic chain might produce temporary pressure on it due to rapid change in size caused by hemorrhage or softening. These tumors of the thyroid are prone to cystic degeneration. A hemorrhage into the cyst might explain sudden change in size. The blood picture suggests infection. I tried to explain the slight leukocytosis and the slight amount of fever also on the basis of hemorrhage into a degenerative cyst or to necrosis. X-ray films show the deviation of the trachea. They do not show calcification in the region of the neck in

which the nodes are located, which one might expect with tuberculosis. The location of the mass is very high. There is no evidence of Hodgkin's disease elsewhere in the chest and the mass is above the hilar nodes and in a region which is perfectly comparable with a substernal thyroid mass. So I will rest with that diagnosis, a malignant adenoma of the thyroid with cervical and mediastinal metastases.

DR PAUL D WHITE: Why could not these two attacks of faintness be paroxysmal tachycardia brought on by a full stomach plus the pressure?

DR TRACY B MALLORY: It could be possible. Anatomically I cannot answer that.

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#### CLINICAL DIAGNOSIS

Neurofibroma of right neck

#### DR MARKS'S DIAGNOSIS

Malignant adenoma of the thyroid

#### ANATOMICAL DIAGNOSIS

Papillary adenocarcinoma of thyroid

#### PATHOLOGICAL DISCUSSION

DR MALLORY: The specimen which was removed consisted of a lobe of thyroid and a chain of enlarged cervical lymph nodes that measured 17 cm in length. There were about fourteen separate nodes that we counted making up the chain and also three or four separately submitted nodes which were not connected with the main chain. All the various specimens showed the same histologic picture. It was that of a papillary adenoma of the thyroid. We know that all these papillary adenomas are potentially malignant just as the rather similar looking tumors of the ovary are, although the usual histologic signs of malignancy may not be very obvious. These cases often present a difficult problem to both the surgeon and

# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25131

### PRESENTATION OF CASE

A thirty-one-year-old single Canadian was admitted complaining of swelling of the neck and palpitation.

About fourteen years before admission the patient first noticed a swelling in the right side of his neck. This did not increase in size and produced no significant symptoms. There were no choking sensations and no pain. There was no progression in the size of the swelling for ten years preceding his admission. Four years ago he entered the Out Patient Department where he was advised to have his thyroid operated on. This he refused to do. Ten weeks before entry following a heavy meal he had a warm sensation in the chest and epigastrium, developed a feeling of faintness, which lasted about six or eight minutes, and broke out into cold perspiration. He entered an outside hospital where he was told that he was all right and was advised to eat light meals and take soda. A week later he had a similar episode about one hour after a light evening meal. Physical examination in the Out Patient Department on the following day showed enlarged nodes in the neck. These were thought to be tuberculous. An electrocardiogram was normal. The blood pressure was 130 systolic, 80 diastolic. He came to the tumor clinic of this hospital three weeks before entry, at which time the nodes in the neck were again noted. The left lobe of the thyroid was small but contained a 1-cm. nodule. The right lobe was the size of a small lemon, was firm, and was distinct from the lateral mass of nodes. His weight had remained normal. He had not had chest pain, dyspnea, night sweats, cough or dysphagia.

Physical examination showed a well-developed and nourished man in no distress. There was a large matted mass of non-tender nodes occupying the anterior and posterior cervical regions on the right except for the nodule in the thyroid. The right lobe of the thyroid measured 3 cm. in diameter and was firm. The nodes measured up to 2.5 cm. in diameter and were movable beneath the skin. The left side of the neck was essentially normal. Examination of the chest and abdomen

was negative. The blood pressure was 140 systolic, 100 diastolic.

The temperature was 99°F, pulse 80, respirations 24.

Examination of the urine was negative. The blood showed a red-cell count of 5,460,000 with 85 per cent hemoglobin, and a white-cell count of 11,000 with 86 per cent polymorphonuclears. A blood Hinton test was negative.

X-ray films of the chest showed displacement of the trachea to the left, apparently by a mass which lay in the right mediastinum and extended up into the right neck.

On the eighth hospital day an operation was performed.

### X-RAY INTERPRETATION

DR. AUBREY O. HAMPTON: There is a definite displacement of the esophagus and trachea to the left and thickening of the soft tissues in front of the trachea. I think we ordinarily call such a picture a tumor of the thyroid.

### DIFFERENTIAL DIAGNOSIS

DR. GEORGE A. MARKS: It seems to me the problem here is primarily whether to consider the mass of nodes separately or with the nodular thyroid as all part of one picture. The history is not quite clear as to just when the nodes were first found. The man is said to have had a mass in his neck for fourteen years and on examination in the Out Patient Department four years before his present entry a thyroidectomy was recommended. It was only when he returned here that any mention is made of the nodes, so I think it is fair to assume that the mass in his neck which was said to have been present fourteen years was probably the right lobe of the thyroid.

Going back to consider the nodes themselves, if they are to be considered separately, it seems to me the diagnosis lies between tuberculosis and lymphoblastoma, Hodgkin's disease or lymphosarcoma. The course since the development of the nodes might be consistent with tuberculosis although there is nothing striking in the physical examination in that regard. Tuberculous nodes are frequently tender, and episodes of tenderness may be associated with them, even though they do not go on to abscess formation. I think one of the striking aspects of the whole case is the fact that this man apparently was in such good health when he was admitted to the hospital. The course of tuberculous adenitis would probably hold episodes of fever. Hodgkin's disease, although it may be restricted to one side of the neck for a fairly long time, usually has a more debilitating course with relapses and remissions than is evidenced in the

history in this particular case. Fever is common, often to a fairly high degree. The other aspect which strikes me is the fact that he had so few symptoms referable to the mass itself, or to the nodes. The history records specifically the absence of chest pains, of difficulty in swallowing or difficulty in breathing. Hodgkin's disease in the mediastinum is very frequently accompanied by rather severe symptoms from pressure either on the esophagus and trachea or on the various branches of the sympathetic chain.

I do not believe that either of these diagnoses fulfills the picture as it is given here and the third diagnosis which we certainly ought to consider is that of a primary lesion of the thyroid. It is fair to assume that he had an enlarged thyroid for a period of years. He did not show signs of hyperthyroidism. His weight is said to have remained steady. There is no mention of the other usual signs and symptoms of hyperthyroidism. He did have elevation of blood pressure and that is about all that can be even faintly suggestive of hyperthyroidism. If it is not hyperthyroidism then the various tumors of the thyroid must be considered. The one tumor which seems to fit all the various findings is the tumor classed as malignant adenoma. This may appear at an early age. The initial enlargement of the thyroid may remain without much change in size over some period of years and it eventually metastasizes. When it does, it may go by direct extension or by lymphatic invasion to the cervical nodes or into the mediastinum or by extension in veins into the lungs or bone. The tumor and its metastases may both be very highly differentiated and may suggest normal thyroid tissue. It is not a rapidly progressing and debilitating process such as adenocarcinoma or papillary carcinoma of the thyroid.

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the pathologist We have seen several cases in which a single nodule was removed from the neck as a biopsy and in which the question comes up, Is it metastasis to a lymph node or is it tumor of accessory thyroid tissue? We know, of course, that accessory thyroid tissue is particularly prone to develop into papillary cyst adenoma. It may be very difficult to tell from looking at the sections whether one is dealing with primary tumor rising in accessory thyroid tissue or with metastasis from a primary focus in the thyroid itself. In this case with the multiple gland involvement there is of course no question. We have seen a number of these cases in this hospital and they all have run a very slow course such as this one has. I do not see how we can tell how long the primary tumor has been present and over how long a period metastases have been developing. I think one is prone to think of carcinoma of the thyroid as one of the few forms of cancer that frequently metastasizes by the blood stream, and we therefore forget the possibility that it not infrequently metastasizes via the lymphatics just as ordinary cancer does.

DR MARKS Was the mass in the mediastinum a lower pole of the node?

DR MALLORY The lower pole of the long chain of nodes

### CASE 25132

#### PRESENTATION OF CASE

A sixty-five-year-old, Austrian Hebrew building wrecker entered complaining of right chest pain, cough and blood-streaked sputum.

One week before entry, at night, without previous cough, sputum or pain, the patient developed "grippe" and "cold." He had recovered ten days previously from a similar condition. The last attack was soon followed by a sudden onset of sharp, stabbing pain in the right side, involving the right lumbar region, right axilla and right shoulder, associated with a cough productive of dark-red blood mixed with mucus. Coughing increased the pain. He had a temperature of 100°F but no chill. His physician gave him a hypodermic for the pain and referred the patient to an outside hospital where he continued to raise dark-red sputum. His chest was strapped, without relief. The blood white-cell count ranged from 9000 to 13,000. The temperature ranged from 100.5 to 99°F, the pulse from 110 to 70. Respirations remained at 20. X-ray films of the chest showed density obscuring the right costophrenic angle, suggestive of fluid, and haziness of the left costophrenic angle. There was also

some density of the right hilus in the region of the descending bronchus. The heart shadow was normal. An electrocardiogram showed no evidence of heart disease. A chest tap yielded some bloody fluid which showed no tumor cells.

The patient denied any weight loss, weakness or shortness of breath. He had worked considerably with iron and steel.

Physical examination on entry showed a well-developed and nourished man in no distress. Examination of the heart was negative. The blood pressure was 130 systolic, 80 diastolic. Coarse intermittent rales were heard in the right base posteriorly and flatness and dullness were made out in the inferior lateral portion. The remainder of the physical examination was noncontributory.

The temperature was 98°F, the pulse 80, the respirations 20.

The urine examination was negative. The blood showed a red-cell count of 4,400,000 with 80 per cent hemoglobin, and a white-cell count of 9400 with 72 per cent polymorphonuclears. The non-protein nitrogen of the serum was 26 mg per cent. The sputum was bloody and non-odorous.

X-ray films of the chest showed a local area of density in the right costophrenic angle near the posterior axillary line, which was in contact with the pleura, moved with respiration and was convex toward the lung root. There was hazy density around the shadow, which extended upward along the costophrenic angle and extended into the interlobar pleura. The anterior costophrenic angle on the right side was shallow. There was a dense line extending from the area of consolidation upward and medially toward the lung root. There was no mediastinal shift and the remainder of the lung fields were clear.

On the second hospital day the patient's condition remained essentially unchanged. The following day the patient complained of substernal pain and soon thereafter shortness of breath. Ten minutes later he was pale, cyanotic and showed definite air hunger. The cervical veins were dilated. The pulse was not obtainable at the wrist and there was no measurable blood pressure. The lungs were clear. The heart rate was very slow, the sounds feeble. The patient's condition rapidly became worse and he died about forty minutes later.

#### X-RAY INTERPRETATION

DR RICHARD SCHATZKI There is a lesion in the right lower lobe posteriorly. An almost triangular area of consolidation is seen close to the pleural surface, with a linear area of increased density going toward the hilus. I came in too late

to hear the history I should like to know how long that has been going on

DR. THEODORE C. PRATT It started a week before entry with cough, chest pain and hemoptysis and with bloody fluid in the pleural cavity

DR. SCHATZKI Of course that makes the diagnosis definite

#### DIFFERENTIAL DIAGNOSIS

DR. PRATT The differential diagnosis deals with those conditions that produce sudden hemoptysis with associated chest pain of pleural character. It seems to me we can rule out quickly any serious abdominal condition. No mention is made of symptoms or signs referable to the abdomen. Of the chest conditions producing sudden pain and hemoptysis several can be rapidly ruled out. There is no question of pneumonia, with or without empyema, in view of the symptoms and subsequent course. Tuberculosis can also be ruled out because of the essentially negative lung fields elsewhere and the negative past history. Pulmonary abscess or bronchiectasis can be ruled out for the same reason. He had no history of foul sputum and there is nothing in the clinical history to suggest it. A large mediastinal tumor which might erode through into the pleura or involve the lung can also be ruled out because of an apparently normal mediastinum by x-ray. An aortic aneurysm of the thoracic aorta I believe can be definitely excluded because of the completely negative examination so far as the heart and blood pressure are concerned. In addition an aneurysm in order to produce sudden death here would have to rupture into the pleura and produce sudden massive hemorrhage. His death as we see later was not due to sudden massive hemorrhage. In reading over the x-ray report and before I had seen the films I had considered the possibility of carcinoma of the lung, either of the bronchus or of the alveolar type, which we can now probably rule out on the basis of the x-ray alone. He had had no previous cough or dyspnea of long duration and no loss of weight and the fluid removed from his chest showed no tumor cells. Certainly carcinoma of the lung or of the bronchus is very unlikely.

That leaves us with only the diagnosis of pulmonary infarct secondary to a small embolus and followed later by a larger and fatal pulmonary embolus. This diagnosis seems to fit most of the data given. The only objection is that we are given nothing in the history or physical findings suggestive of deep phlebitis. There is no mention of tenderness of the legs or edema. If this were an operative case we could assume with a great deal of assurance that deep phlebitis existed either

in the iliac, femoral or popliteal vein. However, in this case, we have evidence of a definite infection of some type, perhaps respiratory, of about ten days' duration which might have been the etiologic factor for a phlebitis that occurred, possibly, in the pelvic veins. We shall assume that he did have phlebitis. The only other explanation for an infarct due to embolus would be that he had a thrombosis in his right heart or a primary thrombosis in the pulmonary artery, of which there is no evidence. So a pulmonary infarct representing the first episode seems reasonable. The temperature and the elevation of the white count fit in with that, as do his physical findings. The x-ray film, which is interpreted as showing a wedge-shaped area with the apex toward the hilus, also agrees, and I imagine that the extension over to the hilus is a collection of interlobar fluid. Would that be consistent?

DR. SCHATZKI This is a line that Dr. Hampton and Dr. Castleman are studying. It is probably due to atelectasis.

DR. PRATT The type of pain here is consistent with a pulmonary infarct of the right lower lobe and simply means diaphragmatic pleural irritation. I cannot explain the radiation into the lumbar region although I believe that it might occur. Certainly pleural effusion is consistent and with a large infarct can very well be blood stained. I believe, therefore, that the diagnosis is pulmonary infarct secondary to a small embolus occluding one of the pulmonary artery branches and followed by a fatal pulmonary embolus almost completely occluding the pulmonary artery, both emboli arising from the same source, probably a deep phlebitis.

DR. CHAMP LYONS This patient came in with a diagnosis of cancer of the lung, but on entry the brevity of his illness led us to believe he had a pulmonary infarct. We examined his extremities very carefully at the time and were unable to localize any definite signs of peripheral phlebitis.

#### CLINICAL DIAGNOSIS

Pulmonary embolism and infarction

#### DR. PRATT'S DIAGNOSES

Pulmonary infarct and fatal pulmonary embolus  
—both secondary to a deep phlebitis

#### ANATOMICAL DIAGNOSES

Pulmonary embolism, massive  
Pulmonary infarction, recent, right lower lobe  
Thrombophlebitis, organizing, right popliteal vein  
Arteriosclerosis, coronary and aortic, minimal

## PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The only point on which I should be tempted to criticize Dr Pratt's discussion is where he said something about phlebitis in the pelvic veins. That is possible but in the vast majority of cases with massive pulmonary emboli the phlebitis is found in the leg veins. This man had a large thrombus in the right popliteal vein, which was completely occluded. It obviously had at one time run almost all the way up the leg although the cephalad portions were broken off, which accounted for the fatal embolus found curled up in the main pulmonary artery and its right branch, so that it completely blocked the circulation of the right lung and partially that of the left lung. The lungs showed three areas of old infarction quite separate and distinct whereas I think in the x-rays you could not be certain of more than one.

DR PAUL D WHITE It is quite possible that the first attack, thought to be a cold, was the same thing.

DR MALLORY It is certainly possible, but it is equally possible it was a respiratory infection and that the phlebitis and all the rest were secondary to it. I do not see how we can answer that one way or the other. It is very common at autopsy to find multiple infarcts where the x-ray has been able to show only one or two of them. In the series that Dr Castleman and Dr Hampton have been studying recently, it is of interest that 40 per cent of all pulmonary infarcts come from cases from the medical wards that have never had a surgical operation. One has always been inclined to believe that pulmonary embolus is primarily a surgical complaint.

DR WHITE How many of the 40 per cent gave no clinical evidence of phlebitis?

DR MALLORY I should say at least 80 per cent. It is the exceptional case that shows definite evidence of phlebitis, yet in almost every case we

have found a primary phlebitis in the leg veins, certainly in all the cases of massive embolism and even in most of the cases with small infarcts.

A PHYSICIAN Recent cases from the Mayo Clinic indicate that when phlebitis makes itself known clinically the danger is essentially over.

DR MALLORY I should think that was very probably true. This is a type of case one sees all too often and should be a challenge to the medical profession. A patient who has had one pulmonary embolus evidenced by a demonstrable infarct is certainly in danger of subsequent ones, and perhaps a massive fatal one as in this case. It seems as though in the time interval which usually intervenes we ought to be able to advise something that would minimize the danger. As yet we have absolutely nothing to offer.

A PHYSICIAN One could tie off the affected veins if one knew where they were.

DR MALLORY There is practically never any clinical evidence of thrombosis.

DR WHITE I have had three patients this year whose veins I have had tied off.

DR MALLORY What has been the result, from the point of view of circulation?

DR WHITE It has been good.

DR MALLORY They have not developed any obvious circulatory impairment?

DR WHITE One case is still convalescing. The others have done well.

DR MALLORY From the anatomical point of view it is certainly the only logical form of treatment.

DR WYMAN RICHARDSON From the point of view of convention one wants to think several times before putting an old person to bed without good reason. Apparently the critical period is three or four weeks. If a person is in bed for that long he is likely to stay there forever without complications.



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## THE HAZARDS OF PUBLICITY

THE concerted effort to reduce the pneumonia death rate more rapidly than it is reducing itself has been worthy and proper. Health authorities, eminent physicians and committees representing all sorts of interested groups are contributing to the widespread trend and desire to make what we know about this disease available to as large a part of the population as possible. Much of this effort is necessarily in the direction of popular education. Syndicated medical columns, special articles and letters in the newspapers and periodicals, broadcasts under various auspices, insurance company and commercial advertising programs, all have tried to bring a hopeful message to the people. Even if a tube of tooth paste, a cough mixture or a little eye wash has been inadvertently disposed of on the side, there has

been disseminated a tremendous amount of more or less reliable information concerning our most prevalent infectious disease.

Unfortunately we have no technic by which we can simplify the truth and at the same time make it popular. To explain that there are "thirty-two kinds of pneumonia" hardly enlightens the public, nor does it state the facts. When we are cautious and precise, what we say becomes uninteresting as newspaper copy. If, on the other hand, we can devise catchwords and headlines that will attract the attention of the people we can have the publicity resources of the nation practically placed at our disposal. But acceptable headlines must be dramatic, and deliberate dramatization crushes the reality from any subject. The tendency to isolate a single passage or phrase from its context is also difficult to control, it is thus that slogans are made, and thus may be explained the fact that most of them are essentially without meaning. Such are the difficulties that beset the paths of those who would "educate" the public in the field of medicine.

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## MASSACHUSETTS MEDICAL SOCIETY

## SHATTUCK LECTURE

Dr Wilder Penfield, director of the Montreal Neurological Institute and professor of neurology and neurosurgery at McGill University Faculty of Medicine, Montreal, will deliver the Shattuck Lecture at the one hundred and fifty-eighth annual meeting of the Massachusetts Medical Society, to be held in Worcester on June 6, 7 and 8. His title is "Epilepsy and the Cerebral Lesions of Birth and Infancy."

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## POSTPARTUM HEMORRHAGE

Mrs. D., a nineteen-year-old primipara, was first seen on August 17, 1938, when she was about twenty-seven weeks pregnant.

Her family history was essentially negative except for a maternal aunt who died of pulmonary tuberculosis. The patient had had the usual childhood diseases, otherwise her past history was negative. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted four days without pain. Her last period was February 1, 1938, making her due for delivery November 8.

Examination at the time she was first seen disclosed a well-developed and nourished young woman. Her heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The fundus lay midway between the umbilicus and the xiphoid cartilage. The vertex was presenting and floating. The fetal heart was heard best in the right lower quadrant, the rate being 135 per minute. Urinalysis was negative except for a slight trace of albumin. The Wassermann test and urethral and cervical smears were negative.

The patient's prenatal course was normal in all respects. There was no elevation of blood pressure above 120 systolic, 85 diastolic, at any time, no edema developed, nor any other untoward symptoms. Urinalysis was normal throughout the prenatal period.

Slight uterine contractions began at 9 a. m. on November 9, and the patient was delivered of a male child weighing 7 pounds, 14 ounces, by low midforceps at 4:45 p. m. on November 10, after a labor of approximately sixteen hours and after

full dilatation of slightly over three hours. A right lateral episiotomy was performed and was repaired with No. 2 chromic catgut while waiting for the placenta to separate. Fifteen minutes after the delivery of the baby a sudden profuse flow of blood occurred, apparently indicating partial separation of the placenta. The exact amount of blood was not determined, but it was estimated to be about 1000 cc. The patient went rapidly into shock, with sudden pallor, clammy skin, a weak, rapid, thready pulse and sighing respirations. Two cubic centimeters of posterior pituitary extract was immediately administered and the placenta was expressed intact by the Credé method. Two cubic centimeters of ergot was administered following the delivery of the placenta, and the fundus was gently massaged. The patient's pulse rate was 170 per minute, and her general condition was very poor. She was placed in Trendelenburg position, and 500 cc. of 5 per cent glucose in saline solution was given intravenously, and 1/6 gr. of morphine subcutaneously. When the patient was returned to bed, a clysis consisting of 1000 cc. of 5 per cent glucose in saline solution was administered. The patient's condition gradually improved, and four hours post partum her pulse had a rate of 120 per minute and was of fairly good quality. The fundus remained well contracted, and the flow was normal.

Following the initial setback the patient improved rapidly. She was given Feosol and liver extract daily and was discharged on the fourteenth day post partum, with a hemoglobin of 60 per cent and red-cell count of 3,500,000.

*Comment.* This case illustrates a type of postpartum hemorrhage that is frequently seen. The placenta separates quickly after the birth of the baby and is accompanied by a tremendous amount of bleeding. Fortunately oxytocics will usually control the uterus. Had this uterus not contracted well, packing might have been considered, transfusion would probably have been necessary and hysterectomy might have had to be performed. Conservative treatment is all that is necessary in many of these cases, but this case illustrates once more the need that may arise at any time for transfusion and the advisability of being prepared for such an emergency.

## LEGISLATIVE NOTES

## THE CHIROPRACTORS WIN THE FIRST ROUND

Last year the Legislature set up a recess commission to study the matter, among others, of licensing chiropractors. The commission consisted of Senator Jarvis Hunt, of North Attleboro,

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are welcomed and will be discussed by members of the section.

has been distributed for general use. Many feel that this release was premature. The drug has already received a great deal of notice as a therapeutic agent in pneumococcal pneumonia. The practicing physician is now faced with the decision whether to use serum or this new drug.

Bullowa, Plummer and Finland\* have made a strong plea for caution and conservatism in accepting this new agent because of our lack of knowledge of its dangers and of the limitations of its usefulness. In view of the unprecedented publicity in the lay press accorded to the drug we are entirely in agreement with this plea. They recommend that the drug be given a thorough trial in parallel with specific serum before it is enthusiastically endorsed to the exclusion of the latter. Only a large group of observations will throw light on this problem, and it is necessary that every case possible be typed if this information is to be obtained and be of value.

Of course the incidence and mortality of the disease are decreasing, but every doctor who actually cares for pneumonia patients knows that they still die all too frequently. This should be understood by all, especially by those who have lost members of their families by pneumonia during the current year. The millennium as it concerns this disease is far, far away!

### THE EXPLORER PHYSICIAN

ONE of the greatest African travelers, who pioneered in opening up vast territories for Great Britain under the sponsorship of the African Association in the late eighteenth century, was a physician, Mungo Park. Born under humble circumstances, the seventh of thirteen children, he was apprenticed to a surgeon in Selkirk, Scotland, and received his medical degree at Edinburgh at the age of twenty. Coming to London, as most good Scots did, he fortunately fell under the eye of Sir Joseph Banks, then president of the Royal Society. Through Banks, who helped so many young men, Park obtained a post as assistant medical officer on an East Indian boat and spent some time in Su-

matra. Bringing home rare plants to Banks, he was not forgotten by this leader of scientific thought in London. Two years later Banks recommended him to the African Association, and so this young man of twenty-four headed an exploration party to determine the source of the Niger River.

He was absent from England from May, 1795, until December, 1797, and the account of his travels, written in 1798, was published in 1799. The book, so modestly and simply written, became popular at once and required three editions in the same year. Handsome, six-foot Park, a little reserved in manner, became famous overnight, and one can easily imagine what receptions he must have had in London under the guidance of Banks and the members of the Royal Society.

Park, however, retired quietly to Scotland and married the daughter of his old preceptor in Selkirk, an action in every way characteristic of the man. After a few years of practice at Peebles, where he formed a warm friendship with Walter Scott, Park set out on a second expedition to the Niger. All the party were wiped out by fever or accident and Park, one of the last survivors, died in 1806. His body and records were never found.

His *Travels in the Interior Districts of Africa* (London, 1799), relating the story of his hardships during the first exploration, is a splendid narrative, written in an easy style and as fine an adventure book as one could wish for. Much of the trip was made on foot, with only a servant, he was robbed, taken prisoner, escaped, suffered from severe fever, and at last, utterly exhausted, was forced to turn back for lack of funds to purchase food. He had, however, covered three thousand miles under the most trying circumstances.

Park's high-mindedness and perseverance are now legend. His letter to Lord Camden, when he was setting out on his second and what proved to be his last effort, is often quoted: "My dear friends, Mr. Anderson and likewise Mr. Scott, are both dead, but though all Europeans who are with me should die, and though I were myself half dead, I would still persevere, and if I could not succeed in the object of my journey, I would at least die on the Niger."

\*Bullowa, J. G. M., Plummer, N., and Finland, M. Sulfapyridine in the treatment of pneumonia. J. A. M. A. 112:570, 1939.



requires that supplementary reports be sent to this department.

It has been passed to be engrossed.

*H 74* Bill requiring the clerk or registrar in each city or town to give to persons who file notice of intention of marriage suitable information concerning gonorrhea and syphilis. The bill was proposed by the Department of Public Health and it contains no compulsion.

This bill was heard by the Committee on Public Health on March 28

*H 75* Bill making various changes in the laws relating to foods and drugs. The bill was proposed by the Department of Public Health in order to bring the state law into line with the new federal act.

It will be heard by the Committee on Public Health on April 13

*H 670* Bill providing for the issuance of certificates of approval of bacteriological laboratories by the Department of Public Health. The bill was proposed by the Massachusetts Public Health Association and is similar to the one favored by the Massachusetts Medical Society last year

It was heard by the Committee on Public Health on March 23. There was no opposition.

*H 852* Bill requiring licensing of hospitals, convalescent homes and nursing homes. This bill was proposed by the Massachusetts Central Health Council and provides for the Department of Public Health to set up certain standards of health and enforce them

It was heard a second time by the Committee on Public Health on March 23

*H 1407* Bill prohibiting aliens from practicing medicine. This bill was proposed by Rep. Vaughan and is poorly written. It provides that no license be granted to an alien until his first papers have been filed but allows certain very broad exceptions.

This bill was heard by the Committee on Public Health on March 14. An amended bill has been presented.

#### OPPOSE

*H 287* Bill providing for a marriage protection law by requiring a physician's examination and certificate before issuance of marriage licenses. This bill was proposed by Rep. Cutler and it needs major revision before being satisfactory

It was heard before the Committee on Public Health on March 28. (The revised bill, printed above, was favored by the Society)

*H 551* Bill requiring that notices of intention of marriage shall be accompanied by a physician's certificate that neither party is infected with syphilis. This bill was proposed by Dr. William Frankman and also needs major revision before being satisfactory

It was heard by the Committee on Public Health on March 28

*H 758* Bill providing authority to the Board of Registration of Nurses to limit further training of nurses of all classes and attendants under certain conditions. The bill was proposed by Miss Josephine E. Thurlow but is against public policy

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 759* Bill providing for training and licensing of first class bedside nurses. This bill was proposed by Miss Josephine E. Thurlow, but is against public policy

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 858* Bill regulating the practice of nursing. This bill was proposed by the Massachusetts State Nurses Association, and while it is better than last year's bill, some of last year's defects are still present.

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 985* Bill requiring doctors of medicine and doctors of osteopathy on the Board of Registration in Medicine. This bill was proposed by the Massachusetts Osteopathic Association and would put two osteopathic physicians on the Board

It was heard before the Committee on Public Health on February 9. Our ballots were presented to the committee. The committee has voted leave to withdraw, and this report has been accepted in the House.

*H 986* Bill providing for a doctor of medicine and a doctor of osteopathy on the Approving Authority and the status of approvals by the American Medical Association and the American Osteopathic Association. This bill was proposed by the Massachusetts Osteopathic Association, it weakens the Approving Authority

This bill was heard February 9 by the Committee on Public Health. Our ballots were presented to the committee. The committee has voted leave to withdraw, and this report has been accepted in the House.

*H 1401* Bill providing that certificates of vaccination or non-vaccination shall no longer be required as a prerequisite to the attendance of any child in public schools. This is a typical anti-vaccination bill

It will be heard before the Committee on Public Health on April 4

*H 1898* Bill providing for the establishment and administration of a system of health insurance. This bill was proposed by the State Industrial Council of the Congress of Industrial Organization (CIO) and means complete state insurance medicine with a 4½ per cent pay roll tax. It represents real regimentation of physicians

It was heard by the Committee on State Administration on March 15. There is to be a second hearing on March 31

CHARLES C. LUND, *Chairman*

Committee on State and  
National Legislation

#### TREASURER'S REPORT COVERING REFUND DISTRIBUTION

The Treasurer of the Massachusetts Medical Society makes the following report regarding the refund to district societies for 1939

The Council voted to distribute the sum of \$4000 to district societies. The total number of payments of annual dues received by the Treasurer by March 2, to be counted for the refund, was 3916. Therefore the refund to the district societies for each paid fellow is \$1.021

The following table gives the number of payments in, and the refund to each district as of March 23

chairman, Representatives A M Bessette, of New Bedford, Oscar DeRoy, of Holyoke, and Charles Savage, of West Roxbury, and the following three men appointed by Governor Hurley Edward W Toomey, of Cambridge, Timothy W Cronin, of Cambridge, and Frederick J Hogan, of Winthrop Hearings concerning chiropractic legislation were held in Boston, Springfield, New Bedford and Lowell At these hearings the district legislative committees and many members of the profession tried to explain in a dignified way the importance of a single standard of education for the practice of healing Immediately after the Legislature convened on January 4 the Attorney-General advised that members of such commissions that failed of election could no longer serve on them As the report of the commission had not been written, due to the late commencement of the Legislature and to delay on the part of Governor Hurley in making his appointments, a new man had to be appointed to replace Mr Savage who was not re-elected Representative M J Capeles, of Pittsfield, was appointed Mr Capeles, who attended none of the hearings, has joined Messrs Bessette, DeRoy and Cronin in signing a majority report in favor of the chiropractors Messrs Capeles and Bessette voted for the chiropractors in 1936, so that they are not new converts to the cause

The loss of the first round in this legislative struggle is not fatal, but it means that we must go to work and work hard The chiropractors are already flooding the legislators with letters and petitions The bill must be stopped! We cannot do so by any half measures Each member of the Society resident in Massachusetts should inspire at least ten letters from friends or patients to their representatives and senators opposing this legislation As soon as the date is set for the hearing every doctor in the State should put the date on his calendar and plan either to come himself or to send a voter as a representative The date will be put in this column as soon as it is known

These procedures of course are extreme, and we should not have to use them However, there are a number of legislators who are very much impressed by such interest on the part of voters and who will vote according to their estimate of their constituents' desire Remember—it is your *duty* to be present or to be represented at the Gardner Auditorium at the State House on the day set at 10 00 a m

#### PRE-MARITAL SYPHILIS BILLS

As reported to the Council on February 1 and in this column in some prior issues none of the

bills for pre-marital examination for syphilis have been approved by the Committee on State and National Legislation A practically new bill, which is deemed to be suitable, has been drawn up and agreed to by most of the parties interested in the subject The hearing at the State House will have been held before this issue of the *Journal* is out The committee will have put the Society on record in favor of this bill The text follows

#### HOUSE BILL 287 (revised)

AN ACT PROVIDING FOR A MARRIAGE PROTECTION LAW, BY  
REQUIRING PHYSICIAN'S EXAMINATION AND CERTIFICATE  
BEFORE ISSUANCE OF MARRIAGE LICENSES

*Section 20 of Chapter 207 of the General Laws of Massachusetts is hereby amended*

Such intention of marriage shall not be accepted by the clerk or registrar until he has received from each applicant a statement signed by a registered physician, stating that said physician has examined the applicant and, if he has discovered evidence of any infectious disease which has been declared to be dangerous to the public health by the Department of Public Health, that he has informed both applicants of the nature of the disease and of the possibilities of transmitting it to his or her marital partner or to their children Such examination by said physician shall include a standard serological test for syphilis and said test shall be made by a laboratory of the State Department of Public Health or by a laboratory approved for this test by the Department.

The physician's examination and the laboratory test shall be made not more than thirty days before the issuance of the marriage license A marriage license issued in accordance with this act shall be valid for thirty days, after which time it shall become invalid

Any person who shall fail to comply with the provisions of this act shall be subject to a penalty of not less than ten dollars (\$10 00) nor more than one hundred dollars (\$100 00)

\* \* \*

#### MISCELLANEOUS BILLS

Below is listed the progress in the Legislature of some of the bills in which the Massachusetts Medical Society is interested

#### FAVOR

S 258 See issue of March 9 No change in status

H 59 Identical with S 258

H 60 Bill requiring annual licensing of qualified physicians

It was heard by the Committee on Public Health on February 9 and they have been given the ballots recently filled out by members of the Society, but no report has yet been made

H 72 Bill providing for the care of certain infants prematurely born. It was proposed by the Department of Public Health, and corrects defects in the previous bill.

This bill was amended to H 2080 and has been passed to be engrossed

H 73 Bill providing for supplementary reporting of congenital deformities and birth injuries in infants. The bill was proposed by the Department of Public Health and

requires that supplementary reports be sent to this department.

It has been passed to be engrossed

*H 74* Bill requiring the clerk or registrar in each city or town to give to persons who file notice of intention of marriage suitable information concerning gonorrhea and syphilis. The bill was proposed by the Department of Public Health and it contains no compulsion

This bill was heard by the Committee on Public Health on March 28

*H 75* Bill making various changes in the laws relating to foods and drugs. The bill was proposed by the Department of Public Health in order to bring the state law into line with the new federal act.

It will be heard by the Committee on Public Health on April 13

*H 670* Bill providing for the issuance of certificates of approval of bacteriological laboratories by the Department of Public Health. The bill was proposed by the Massachusetts Public Health Association and is similar to the one favored by the Massachusetts Medical Society last year

It was heard by the Committee on Public Health on March 23. There was no opposition

*H 852* Bill requiring licensing of hospitals, convalescent homes and nursing homes. This bill was proposed by the Massachusetts Central Health Council and provides for the Department of Public Health to set up certain standards of health and enforce them

It was heard a second time by the Committee on Public Health on March 23

*H 1407* Bill prohibiting aliens from practicing medicine. This bill was proposed by Rep. Vaughan and is poorly written. It provides that no license be granted to an alien until his first papers have been filed but allows certain very broad exceptions

This bill was heard by the Committee on Public Health on March 14. An amended bill has been presented

#### OPPOSE

*H 287* Bill providing for a marriage protection law by requiring a physician's examination and certificate before issuance of marriage licenses. This bill was proposed by Rep. Cutler and it needs major revision before being satisfactory

It was heard before the Committee on Public Health on March 28. (The revised bill, printed above, was favored by the Society.)

*H 251* Bill requiring that notices of intention of marriage shall be accompanied by a physician's certificate that neither party is infected with syphilis. This bill was proposed by Dr. William Frankman and also needs major revision before being satisfactory

It was heard by the Committee on Public Health on March 28

*H 758* Bill providing authority to the Board of Registration of Nurses to limit further training of nurses of all classes and attendants under certain conditions. The bill was proposed by Miss Josephine E. Thurlow but is against public policy

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 759* Bill providing for training and licensing of first class bedside nurses. This bill was proposed by Miss Josephine E. Thurlow, but is against public policy

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 858* Bill regulating the practice of nursing. This bill was proposed by the Massachusetts State Nurses Association, and while it is better than last year's bill, some of last year's defects are still present.

It was heard by the Committee on Public Health on February 2 and again on March 7

*H 985* Bill requiring doctors of medicine and doctors of osteopathy on the Board of Registration in Medicine. This bill was proposed by the Massachusetts Osteopathic Association and would put two osteopathic physicians on the Board

It was heard before the Committee on Public Health on February 9. Our ballots were presented to the committee. The committee has voted leave to withdraw, and this report has been accepted in the House.

*H 986* Bill providing for a doctor of medicine and a doctor of osteopathy on the Approving Authority and the status of approvals by the American Medical Association and the American Osteopathic Association. This bill was proposed by the Massachusetts Osteopathic Association, it weakens the Approving Authority

This bill was heard February 9 by the Committee on Public Health. Our ballots were presented to the committee. The committee has voted leave to withdraw, and this report has been accepted in the House.

*H 1401* Bill providing that certificates of vaccination or non vaccination shall no longer be required as a prerequisite to the attendance of any child in public schools. This is a typical anti vaccination bill.

It will be heard before the Committee on Public Health on April 4

*H 1898* Bill providing for the establishment and administration of a system of health insurance. This bill was proposed by the State Industrial Council of the Congress of Industrial Organization (C.I.O.) and means complete state insurance medicine with a 4½ per cent pay roll tax. It represents real regimentation of physicians.

It was heard by the Committee on State Administration on March 15. There is to be a second hearing on March 31

CHARLES C LUND, *Chairman*

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The following table gives the number of payments in, and the refund to, each district as of March 23

DISTRICT	NUMBER	REFUND
	REPORTED PAID	
Barnstable	42	\$43 07
Berkshire	105	107 30
Bristol North	50	51 22
Bristol South	155	158 33
Essex North	175	178 75
Essex South	206	210 39
Franklin	39	40 00
Hampden	236	241 02
Hampshire	57	58 37
Middlesex East	109	111 39
Middlesex North	105	107 30
Middlesex South	786	802 57
Norfolk	664	678 00
Norfolk South	113	115 44
Plymouth	117	119 53
Suffolk	527	538 13
Worcester	348	355 37
Worcester North	82	83 82
	3916	\$4000 00

In 1938, for comparison, the total number of payments for the refund was 3784

CHARLES S BUTLER, M.D., *Treasurer*

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 3

##### BARNSTABLE

Sunday, April 9, at 4 00 p m., at the Cape Cod Hospital, Hyannis Subject—The Indications and Contraindications for Removal of Tonsils and Adenoids Instructor Warren R. Sisson Donald E. Higgins, *Chairman*

##### BERKSHIRE

Thursday, April 6, at 4 30 p m., at the House of Mercy Hospital, Pittsfield Subject—Gonorrhea Modern treatment of gonorrhea. Instructor Oscar F. Cox, Jr. Melvin H. Walker, *Chairman*

##### FRANKLIN

Wednesday, April 5, at 8 00 p m., at the Franklin County Public Hospital, Greenfield. Subject—Sepsis Instructor A. Gordon Gauld. Halbert G. Stetson, *Chairman*

##### HAMPDEN

Thursday, April 6, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—Bright's Disease and Hypertension Evaluation of new therapy, diagnosis Instructor W. Richard Ohler George L. Schadt, *Chairman*

##### MIDDLESEX SOUTH

Tuesday, April 4, at 4 30 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Sub-

ject—Whooping Cough The present status of vaccine therapy both as prophylactic and therapeutic measure, the early diagnosis by laboratory procedures, and the treatment of complications. Instructor Louis K. Diamond. Alexander A. Levi, *Chairman*

##### SUFFOLK

Thursday, April 6, at 4 30 p m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston Subject—Latent syphilis diagnosis and treatment. Instructor C. Guy Lane. Reginald Fitz, *Chairman*

#### DEATHS

BENNER—RICHARD S. BENNER, M.D., of Springfield, died March 23. He was in his sixty-fourth year.

Dr. Benner received his degree from the Harvard Medical School in 1903. He was a staff member at the Springfield and Wesson hospitals, Springfield. Among his affiliations were fellowships in the Massachusetts Medical Society and the American Medical Association and memberships in the New England Obstetrical and Gynecological Society, the American College of Surgeons and the New England Surgical Society.

His widow, two sons and two daughters survive him.

BYRNE—CLAUDIUS J. BYRNE, M.D., of 1066 Main Street, Worcester, died March 18. He was in his fifty-sixth year.

Born in Moultonboro, New Hampshire, he attended high school in Manchester, New Hampshire, and was graduated from Tilton Seminary, Tilton, New Hampshire. He received his degree from Tufts College Medical School in 1910.

Dr. Byrne was one of the two senior surgeons at the Worcester City Hospital and last January was elected president of the Worcester City Hospital Staff Association. He was also surgeon at Wickwire Spencer Steel Company. His memberships included the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons.

His widow, a son and a sister survive him.

DRURY—JOHN N. DRURY, M.D., of 9 Central Street, Lowell, died November 19, 1938. He was in his fifty-eighth year.

Born in Lowell, he attended the local schools and received his degree from New York University College of Medicine in 1904. He also graduated from the Bellevue Medical School. Dr. Drury was a staff member of the Bellevue Hospital for eight years and later conducted a private practice in New York City until 1914, when he returned to Lowell.

A great deal of his time was given to the tuberculosis clinic conducted by the city health department. Dr. Drury was a fellow of the Massachusetts Medical Society and of the American Medical Association.

His widow, a daughter, a son, his father, three brothers and several nieces and nephews survive him.

GRAY—ELIZABETH T. GRAY, M.D., of 149 Warren Street, Roxbury, died March 24. She was in her seventy-seventh year.

Born in Roxbury, she attended Girls High School and was graduated from the Posse School of Physical Education in 1892. She received her degree from the Woman's Medical College of the New York Infirmary for Women and Children in 1895.

After her retirement ten years ago she was appointed consulting surgeon of the New England Hospital for Women and Children and at the time of her death was a director and faculty member of the Posse School

A nephew survives her

**McLAUGHLIN**—**JOSEPH I McLAUGHLIN, M.D.**, of 92 Walnut Avenue, Roxbury, died March 26. He was in his seventy ninth year

Born in Boston he was educated in the Boston schools and at Boston College and received his degree from the Harvard Medical School in 1890. Dr McLaughlin was appointed physician at the Charlestown State Prison in 1891 and had continued his private practice in Roxbury until several months ago

He was a fellow of the Massachusetts Medical Society and the American Medical Association

Two sisters survive him.

**WOODALL**—**CHARLES S WOODALL, M.D.**, of Brandon, Vermont, died March 26. He was in his forty seventh year

He received his degree from the Harvard Medical School in 1924. For twelve years he served as assistant superintendent of the Fernald State School in Waverley and resigned to become the head of the Brandon State School. He was a diplomate of the American Board of Neurology and Psychiatry and a member of the National Board of Medical Examiners

Dr Woodall was a fellow of the Massachusetts Medical Society and the American Medical Association and held memberships in the American Psychiatric Association and the New England Society of Psychiatry

His widow survives him

## MISCELLANY

### YOUR HEALTH BROADCASTS

The next series of 'Your Health' broadcasts, sponsored by the American Medical Association and the National Broadcasting Company and heard over the Blue Network each Wednesday at 2 00 p m., is entitled 'Health Education'. It consists of four broadcasts as follows

April 5 Don't Believe Everything!

Fallacies and popular beliefs that are not true and that influence behavior in a manner detrimental to health

April 12 Learning to Live.

Elements of mental hygiene, getting along with people, adjustment to environment.

April 19 Accidents Don't Just Happen—

Accidents in the home and on the highway and ways to avoid them.

April 26. What Is a Doctor?

The characteristics of a reputable physician as distinguished from cultists, quacks, fakers, faddists or exploiters.

### MANIFESTO BY BALKAN MEDICAL UNION

The Balkan Medical Union, in session at Istanbul, for the fifth Medical Week,

HAVING TAKEN INTO CONSIDERATION the terrible sufferings which a total war will bring upon the civil population of open towns with a total lack of any adequate means of protection, and

HAVING DISCOVERED that even in its restricted form the project of 'sanitary towns' has not yet been adopted, and that all efforts made to protect civilians against chemical warfare have till now remained as proposals only, and that even the protocol prohibiting the use of asphyxiating gas has not yet been ratified by all nations, therefore

HAS DECIDED to address itself to doctors of every nation with an appeal to take active measures and to fulfill this professional and humanitarian duty of awakening and stirring public opinion

The Balkan Medical Union believes that only enlightened international opinion can make plain the imminence of the danger and the proved uselessness, even for the victor, of these terrible atrocities, and can thus lead to effective action. The immutable truth that *hate breeds only hate and atrocity breeds vengeance*, must be impressed on everyone.

Prof Dr Bensis, Dr Scaramanga (Athènes), Dr Zika Marković, Prof Dr K. Sahović, Dr M. Simović (Beograd), Prof Dr Gheorghiu, Dr Popescu Buzzeu (Bucarest), Prof. Dr Akil Muhtar Ozden, Prof Sedat Tavat, Prof. Dr A Süheyl Ünver (Istanbul)

## CORRESPONDENCE

### UNITED JEWISH CAMPAIGN

*To the Editor* At this time of extreme need for the Jews, the question is raised, "What are Jews of America doing to help?" It has come to my attention that a nationwide campaign is being launched by this race to raise a tremendous sum of money to help in giving relief.

On March 19, the United Jewish Campaign officially opened with the object of raising money for the purposes listed below

1 For the relief of the dislocated groups in Europe, under the direction of the Joint Distribution Committee.

2 For the United Palestine Appeal, the funds of which are to be used in co-ordinating settlement and protecting in every way both the settled population and the refugees who have flocked to Palestine to the number of 200,000 in the past few years

3 For the National Co-ordinating Committee Fund, which has the purpose of maintaining and distributing refugees in the United States and elsewhere.

In addition, certain re-educational and cultural programs are being financed. The scope of the relief work to be done is world wide, and the suffering to be relieved is abysmal

Naturally, the Jews will take care of the larger part of the financing of this immense problem. However, I believe that there are many doctors in this community who may wish to show their sympathy and good will by making a small contribution toward this campaign which is humane in the most complete meaning of the word and which is to uphold the dignity and defend the liberty of human beings

Those who are interested to do so may send a note or a check to Dr Abraham Myerson, Lister Building, Boston, who is chairman of the Medical Committee.

HILBERT F DAY, M D

412 Beacon Street,  
Boston.

# ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of February 7 the following have been accepted

## Abbott Laboratories

Abbott's Nicotinic Acid Tablets 50 mg  
Abbott's Nicotinic Acid Tablets 100 mg

## Arzol Chemical Co

Mercurochrome Applicators — Arzol

## Eli Lilly & Co

Ampules Metycaine 2 per cent, 30 cc, in rubber-stoppered vials

## Mead Johnson & Co

Mead's Nicotinic Acid Tablets, 20 mg

## Medical Arts Laboratory

Rabies Vaccine (Killed Virus) packages of 7 vials

## Merck & Co, Inc.

Nicotinic Acid — Merck

## Wm S Merrell Co

Ephedrine Sulfate — Merrell  
Ampule Solution Ephedrine Sulfate — Merrell,  $\frac{1}{4}$  gr (0.05 gm), 1 cc.  
Ampule Solution Mercury Succinimide — Merrell,  $\frac{1}{6}$  gr (0.01 gm.), 1 cc

## The National Drug Co

Immune Globulin (Human)

## The Upjohn Co

Solution Procaine Hydrochloride 2 per cent, 30 cc vials  
Solution Procaine Hydrochloride  $\frac{1}{2}$  per cent with Epinephrine, 5 cc.  
Ampule Solution Procaine Hydrochloride 2 per cent with Epinephrine, 1 cc.  
Ampule Solution Procaine Hydrochloride 2 per cent with Epinephrine, 3 cc.  
Solution Procaine Hydrochloride 1 per cent with Epinephrine, 30 cc. vials  
Solution Procaine Hydrochloride 2 per cent with Epinephrine, 30 cc. vials

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,  
Chicago, Illinois

## NOTICES

### REMOVAL

BERNARD ZUCKERMAN, M.D., announces the removal of his office to 1804 North Avenue, Bridgeport, Connecticut.

### ANNOUNCEMENT

DR. WILLIAM E. BROWNE, of 587 Beacon Street, Boston, has resumed in full his former duties of practice following an illness of several months.

## UNITED STATES CIVIL SERVICE EXAMINATIONS

Associate Medical Officer, \$3200 a Year

Applications must be on file with the United States Civil Service Commission at Washington, District of Columbia, not later than April 10

Applicants must have had at least one year of general internship, or one year in a special branch. They must have been graduated from a medical school of recognized (Class A) standing with the degree of M.D., subsequent to May 1, 1934

Associate Health Education Specialist, \$3200 a Year  
Assistant Health Education Specialist, \$2600 a Year

Applications must be on file with the United States Civil Service Commission at Washington, District of Columbia, not later than April 17

Applicants for either position must have successfully completed a full four-year course leading to a bachelor's degree in a college or university of recognized standing

Applicants for the position of assistant health education specialist must show at least two years of postgraduate study successfully completed toward a certificate, diploma or a degree in hygiene or public health in a college or university of recognized standing

\* \* \*

The necessary forms may be obtained from the Secretary, Board of the United States Civil Service Examiners, at any first-class post office, from the United States Civil Service Commission, Washington, District of Columbia, or from the United States Civil Service district office.

## BOSTON DOCTORS' SYMPHONY ORCHESTRA



*Nicholas Slonimsky*

Rehearsals of the newly organized Boston Doctors' Symphony Orchestra, conducted by Nicolas Slonimsky, are held every Thursday evening at 7 30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430)

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p.m. on Thursday, April 6, in the amphitheater of the Peter Bent Brigham Hospital, Dr William P. Murphy will give a medical clinic. Practitioners and medical students are cordially invited to attend

## HOSPITAL COUNCIL

The annual meeting and luncheon of the Hospital Council of Boston will be held at the Palmer Memorial, New England Deaconess Hospital, 195 Pilgrim Road, Boston, on Tuesday, April 11, at 12 30 o'clock.

Miss Carrie M. Hall, R.N., will report on her investigation of nursing homes.

## NEW YORK ACADEMY OF MEDICINE

The Twelfth Graduate Fortnight of the New York Academy of Medicine will be held from October 23 to November 3. The subject of the Fortnight will be The Endocrine Glands and Their Disorders.

The program will include clinics and clinical demonstrations at many of the hospitals of New York City, evening addresses and appropriate exhibits. The evening sessions at the Academy will be addressed by recognized authorities in their special fields.

A complete program and registration blank may be secured by addressing Dr Mahlon Ashford, New York Academy of Medicine, 2 East 103rd Street, New York City.

## DELTA OMEGA LECTURE

The eleventh Delta Omega Lecture of the Department of Biology and Public Health of Massachusetts Institute of Technology will be held at the Massachusetts Institute of Technology, Cambridge, on Friday, March 31, at 5 00 p m.

Dr John E Gordon will speak on Public Health in the Balkans.

The lecture is open to all who are interested.

## AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS

The twenty fourth annual meeting of the American Association of Industrial Physicians and Surgeons with the American Conference on Occupational Diseases and Industrial Hygiene will be held at the Hotel Statler, Cleveland, Ohio, June 5, 6, 7 and 8. A program of timely interest and importance will be presented by speakers of outstanding experience in all the medical and engineering problems involved in industrial health. A cordial invitation is extended to all whose interests bring them in contact with these problems. Information regarding hotel accommodations, and so forth, may be obtained from A G Park, Convention Manager, 540 North Michigan Avenue, Chicago.

## JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston  
Auditorium, 9-10 a m.

## MEDICAL CONFERENCE PROGRAM

Tuesday, April 4—Low Back Pain. Dr J D Adams  
Wednesday, April 5—Hospital Case Presentation Dr S J Thannhauser  
Thursday, April 6—The Status of Tuberculosis in the British Isles. Dr S V Pearson  
Friday, April 7—Adrenal Function and Angina Pectoris (Theory and Therapy) Dr William Raab  
Saturday, April 8—Hospital Case Presentation Dr S J Thannhauser  
Tuesday, April 11—Physical Examinations of Groups Dr R W Buck.  
Wednesday, April 12—Hospital Case Presentation Dr S J Thannhauser  
Thursday, April 13—Metrazol Therapy in Dementia Praecox. Dr Arthur Berk.  
Friday, April 14—Here and There in Endocrinology Dr Fuller Albright.  
Saturday, April 15—Hospital Case Presentation Dr S J Thannhauser  
Tuesday, April 18—Some Newer Aspects of the Treatment of Acidosis. Dr Nelson R. Saphir  
Thursday, April 20—Medical Social Service Case Presentation District Service and Social Service Staff

Friday, April 21—Ascorbic Acid. Dr Allan Butler  
Saturday, April 22—Hospital Case Presentation Dr S J Thannhauser  
Tuesday, April 25—Diagnosis of Atypical Jaundice. Dr William Dameshek.  
Wednesday, April 26—Hospital Case Presentation Dr S J Thannhauser  
Thursday, April 27—Alcohol. Chemical tests for alcoholism. Dr Sydney Selesnick.  
Friday, April 28—Heredity and Environment in Relation to Intelligence, Personality and Mental Disease. Dr Abraham Myerson.  
Saturday, April 29—Hospital Case Presentation Dr S J Thannhauser

FAULKNER HOSPITAL  
CLINICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, April 6, at 5 00 p m.

There will be a discussion of cases by Drs J S Hodgson and G M Morrison.

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, APRIL 3

## MONDAY APRIL 3

First Annual Regional Convention of the Association of Medical Students. Harvard Medical School

\*4 p m Physicians and medical students are cordially invited to attend a clinic presented by the medical surgical and orthopedic services of the Infants and Children's hospitals in the amphitheater of the Children's Hospital

## TUESDAY APRIL 4

9 10 a m Joseph H Pratt Diagnostic Hospital Low Back Pain Dr J D Adams.

10 a m 12 30 p m Tumor clinic Boston Dispensary

## WEDNESDAY APRIL 5

\*9 10 a m. Joseph H Pratt Diagnostic Hospital Hospital case presentation. Dr S J Thannhauser

\*12 m Clinicopathological conference Children's Hospital amphitheater

## THURSDAY APRIL 6

\*9 10 a m Joseph H Pratt Diagnostic Hospital The Status of Tuberculosis in the British Isles. Dr S V Pearson

\*3.30 p m Medical clinic at the Peter Bent Brigham Hospital  
5 p m Faulkner Hospital clinicopathological conference.

## FRIDAY APRIL 7

9 10 a m. Joseph H Pratt Diagnostic Hospital Adrenal Function and Angina Pectoris (Theory and Therapy) Dr William Raab

\*10 a m 12 30 p m. Tumor clinic Boston Dispensary

12 m Urological conference, Massachusetts General Hospital lower outpatient amphitheater

## SATURDAY APRIL 8

\*9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser

10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr Henry A. Christian

Open to the medical profession

MARCH 31—Delta Omega Lecture. Notice above.

MARCH 31—Boston Dispensary luncheon meeting of the clinical staff Page 542 issue of March 23

APRIL 1 2 and 3—First Annual Regional Convention of the Association of Medical Students Page 541 issue of March 23

APRIL 2—Health Lecture. Quincy City Hospital. Page 363 issue of February 23

APRIL 4—Lawrence Cancer Clinic. Page 541 issue of March 23

APRIL 4 29—Joseph H Pratt Diagnostic Hospital Medical Conference Program Notice above.

APRIL 6—Medical Clinic at the Peter Bent Brigham Hospital Page 550

APRIL 6—Faulkner Hospital clinicopathological conference. Notice above.

APRIL 11—Hospital Council. Page 550

APRIL 13—Pentucket Association of Physicians 8.30 p m Hotel Bartlett, 90 Main Street Haverhill

- APRIL 21 and 22 — New England Health Education Institute Page 542 issue of March 23
- MAY 7 15 — International Congress of Military Medicine and Pharmacy Page 501 issue of September 29
- MAY 12 and 13 — American Heart Association Page 542 issue of March 23
- MAY 13 16 — American Board of Obstetrics and Gynecology Page 457 issue of March 9
- MAY 14 20 — American Physicians Art Association Page 404 issue of March 2
- MAY 15 19 — American Medical Association St Louis Missouri
- MAY 22 23 and 24 — American Association for the Study of Gout Page 405 issue of March 2
- JUNE 5 6 7 and 8 — American Association of Industrial Physicians and Surgeons Page 581
- JUNE 6 7 and 8 — Massachusetts Medical Society Worcester
- JUNE 12 17 — Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19
- JUNE 26-29 — National Tuberculosis Association Page 936 issue of December 8
- SEPTEMBER — Boston Psychoanalytic Institute Page 450 issue of September 22
- SEPTEMBER 11 15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8
- SEPTEMBER 15-28 — Pan Pacific Surgical Association Page 863 issue of November 24
- OCTOBER 23 NOVEMBER 3 — New York Academy of Medicine Page 581
- FALL 1939 — Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

- APRIL 5 — Addison Gilbert Hospital Gloucester Clinic at 5 p m  
Dinner at 7 p m Speaker Dr Ethan Allan Brown Subject Allergy
- MAY 10 — Annual meeting Salem Country Club Peabody

### NORFOLK DISTRICT

- MARCH 28 — Page 493 issue of March 16

### SUFFOLK

- MARCH 29 — Joint meeting with New England Pediatric Society Page 541

- APRIL 26 — Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

### WORCESTER

- APRIL 12 — Page 542 issue of March 23
- MAY 10 — Worcester Country Club — annual meeting

## BOOK REVIEWS

*The Open Mind Elmer Ernest Southard, 1876-1920*  
Frederick P Gay 324 pp Chicago Normandie House, 1938 \$5.00

Why a biography of Elmer Ernest Southard? To his friends, associates and students, this question seems entirely unnecessary. The biographer, Dr Frederick P Gay, professor of bacteriology at Columbia University College of Physicians and Surgeons, certainly never had any doubt in his own mind that the life and work of Southard made him a proper subject for a biography. Not because Southard was the first Bullard Professor of Neuropathology at Harvard Medical School and the first director of the Boston Psychopathic Hospital, not merely because he was an outstanding chess player and the favored disciple of William James and Josiah Royce, but because, in the words of the biographer 'Ernest Southard was a great deal more than an intellectual prodigy who scattered in spiration and, it must be confessed, at times dismay, among the orthodox. He was a great human being. He was a unique, directive and often a predominating influence in the lives of many men and women. He seldom left anyone, who passed more than a fleeting moment in his company, indifferent.'

From Latin School days, Dr Gay believed that his friend was unique. He kept every letter from Southard, and he finally concluded that Southard was a 'genius'. In essence, the writing of the biography was a work of love and probably there was a compulsive drive toward its accomplishment. The biographer, being a scholar and scientist, a friend from boyhood days, a co-student and

colleague, and for a time a co-worker, and throughout Southard's life, a confidant, is eminently equipped not only to present the life and character of Southard, his views and his philosophy, but also to interpret his scientific accomplishments and to evaluate his work and his contribution to medicine and to society. This is what Dr Gay has tried to accomplish.

The book is divided into seventeen chapters dealing with the subjects of inheritance, early life, college years, medical training, personality and career. Two chapters are devoted to Southard's work as a pathologist and neuropathologist. Individual chapters deal with Southard as a state officer, as the director of the Boston Psychopathic Hospital, in psychiatric social work, as an etymologist, philologist, philosopher and psychologist and as an educator and psychiatrist.

In the course of the narration, Dr Gay sketches much of the history of psychiatry in its broadest aspects during the important period 1910-1920, and all who have an interest in this subject will find much of value. In the minds of those who worked in this field during that period, the challenge of Southard's view will again be brought to life. To those of the newer generation much background material will be uncovered.

How well has Dr Gay wrought? This is a hard question for the reviewer — an old disciple of a revered chief — to answer. If Dr Gay succeeds in impressing the reader with the extraordinary influence that Southard had on his students and associates, he will have accomplished a great deal. It is obvious that no biographer can seem completely adequate to one who lived close to Southard and was under his influence for years. But unquestionably it is a good biography. It is pleasant reading, it is anecdotal, it is valuable as a history of psychiatric thought, and it is a thoughtful portrayal of an important and interesting personality.

*Teachable Moments A new approach to health* Jay B. Nash 243 pp New York A. S. Barnes & Co., 1938 \$1.50

From the publisher's blurb one might assume that this is an epoch making treatise on the subject of health training. It is not. Dr Nash is not a physician, he is a popular teacher of physical education, and aiming at popularity, is rather given to oversimplification and the employment of catchwords and phrases. Yet his dos and don'ts of health, though in no sense new, are sound on the whole, and he has not permitted himself to become the propagandist of this or that fad or cult. His book may be recommended with safety if not with enthusiasm.

*The New International Clinics* Original contributions clinics, and evaluated reviews of current advances in the medical arts Edited by George M. Piersol. Vol. 4, N S 1 350 pp Philadelphia, Montreal, New York J. B. Lippincott Co., 1938 \$3.00

The fourth volume of the *New International Clinics* upholds the standard set by previous contributions. There are a number of original contributions on a wide variety of topics. In addition, three reports from clinics are given and one review. This review is perhaps the most important article in the whole volume, being a complete summary of our knowledge of the so-called Cushing's syndrome, with an extensive bibliography. In addition, there are good articles on the placenta, polyneuritis, vitamin B<sub>1</sub> in the American diet, hypertension, and the length of life of cardiac cases. The volume, as usual, is well illustrated by both pictures and diagrams, and the bibliographies are carefully chosen.



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## THE TREATMENT OF GOUT WITH A LOW-FAT, HIGH-CARBOHYDRATE DIET<sup>1</sup>

### Preliminary Report

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A REVIEW of the literature pertaining to the treatment of gout is likely to lead one to the conclusion that it is not amenable to complete control. In this disease great emphasis has been placed on the treatment of the acute arthritic episodes and little on their prevention. It must be accepted that once a patient has gout he continues to have a metabolic defect, and that repeated attacks make for chronic degenerative changes in the joints and visceral organs. It is as though in diabetes the treatment of coma were stressed and little attention were given to its prevention. In a recent article by Talbott and Coombs<sup>1</sup> the following statement was made:

It is our belief that there is no known cure for gout and that once the diagnosis is confirmed the disease will persist until the patient dies. On the other hand, much may be done to afford symptomatic relief especially during acute attacks, when rest in bed, abundant fluids and a soft diet are indicated. The treatment of gout during arthritis-free periods has been and continues to be a subject for argument. Innumerable regimens and diets have been proposed, the merits of which are difficult to evaluate.

They reported 2 cases which tended to show that a diet low in protein and purine was not specific in the treatment of this condition.

Cohen,<sup>2</sup> in a review of 37 cases of gout from the Philadelphia General Hospital between 1929 and 1935, reported that the treatment was invariably satisfactory on a purine-free diet and colchicine. He stated, however, that in cases in which the uric acid level was elevated this elevation continues or increases. Herrick and Tyson<sup>3</sup> reported 6 cases of gout treated by a low-purine diet and colchicine. Of those cases in which follow-up determinations of the uric acid in the blood were taken, 3 returned to normal and 1 was reduced from 8 to 5 mg per cent. In the report of the *Fourth Rheumatism Review*<sup>4</sup> it was stated

that the usual therapy during the attack consisted of rest in bed, protection of joints, hot compresses, purgation, colchicine, cinchophen or salicylates and alkalies, a diet high in carbohydrate and non-purine-containing proteins, low in fats and free of purines. Treatment between attacks included purine restrictions, avoidance of alcohol and the intermittent use of certain drugs.

In England, where gout is relatively frequent, Kersley,<sup>5</sup> physician to the Royal National Hospital for Rheumatic Diseases, subdivided treatment into general hygiene, internal medication and physiotherapy. Under the first is included a diet low in purine and void of beverages such as strong tea, coffee or cocoa, meat extracts and all forms of alcohol, the total caloric value is reduced by cutting down carbohydrate and fat. Colchicine in the acute attack and cinchophen in the chronic state were administered periodically, three days a week.

In the acute episode, Keefer<sup>6</sup> utilizes a diet high in protein and carbohydrate but low in fat and purine. Fluids are forced and wine of colchicum and tincture of rhubarb are given until diarrhea results. He states that the treatment of chronic gout continues to be unsatisfactory and that further investigation of the disease is needed.

Jacobson<sup>7</sup> has proved that a purine-free diet alone is not effective in the treatment of gout, if one is to judge control of this disease by the level of the serum uric acid. He reports that the consumption of a purine-free diet during periods shorter than three months does not significantly influence the level of the uric acid. He also found in 4 cases an apparent direct correlation between the height of the serum uric acid level and the severity of the disease. Of sixty-one serum uric acid determinations on 5 patients who were free of acute attacks of gout on a purine-free diet, only one value was below normal, and of fifty-one determinations on 6 patients during acute gout on a similar diet and, in addition, medication consist-

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ing of aspirin and colchicine, none of the values fell below 7 mg per cent (normal, 6 mg per cent). However, whole blood uric acid decreases of a slight degree have been reported by some authors after the prolonged use of a purine-free diet.

Lockie and Hubbard<sup>8</sup> (1935) proposed the use of a high-carbohydrate, low-fat diet for the treatment of gout. They gave diets high in fat to 4 patients and in each case an attack occurred in a few days. On a low-fat, high-carbohydrate diet the symptoms were relieved in a short time. They concluded that diets high in fat and low in carbohydrate should be avoided in the treatment of gout. Relief was also obtained in patients with severe joint pain by the intravenous injection of 100 to 200 cc of a 50 per cent solution of glucose. We have utilized this procedure during acute attacks, with gratifying results. This experience with production of acute attacks by a high-fat intake was suggested as a provocative test for gout. If in five to seven days after the institution of such a diet pain occurred, a diagnosis of gout could be considered.

Pisani,<sup>9</sup> of Florence, has independently observed that gout is easier to control if an intake high in carbohydrate is maintained. He also resorted to the use of glucose, orally, rectally and intravenously, according to the activity of the disease.

It is our purpose in this preliminary report to demonstrate that gout can apparently be controlled from both the standpoint of symptoms and the level of blood uric acid. The plan of treatment consists of the utilization of a diet high in carbohydrate and low in fat and purine, with the addition of the periodic administration of cinchophen. The diet used is that proposed by Lockie and Hubbard<sup>8</sup> and the cinchophen is given according to the plan of Hench,<sup>4</sup> 7½ gr three times a day for three days each week.

In the early part of the study, uric acid determinations were done on the whole blood, a normal determination being below 4.5 mg per cent. Since the report of Jacobson<sup>7</sup> on the determination of the uric acid in the serum we have used the two methods, and thus have a check, the normal level of uric acid in the serum being 6 mg per cent.

#### CASE REPORTS

**Case 1** A 61-year-old, unemployed watchman was first seen at the clinic in June, 1937. He had had rheumatism of 15 years duration. The condition began with periodic attacks of painful swelling of a toe, ankle or knee, which came on suddenly, were severe for several days at a time and subsided without residual discomfort. Soon the attacks came more often, and grew more severe in that they lasted longer and more joints were involved. In the previous

3 years he had suffered continuously from pain and swelling in the right arm, shoulder and neck and had had to be in bed for weeks at a time, being incapacitated to the point that he could not feed himself.

Physical examination revealed a well-developed man who weighed 160 pounds. The joints of the extremities were enlarged and limited in motion and all movements were done with great discomfort. A pea sized white mass was found in the pinna of the left ear. The value for the blood uric acid was 7.5 mg per cent. A roentgenogram of the hand showed marked hypertrophic changes around the interphalangeal joint and the metacarpophalangeal joints. There was partial loss of the joint space. A diagnosis of gout was readily made. Of particular interest was the fact that in the 15 years of his illness the patient had never been told that his trouble was gout.

Treatment was instituted, consisting of a high-carbohydrate, low purine, low fat diet with the addition of cinchophen. Sixteen months have now passed since the beginning of treatment. The patient has had no further attacks of gout and although his clinical course at first was slow, at the present time he states, "I feel perfectly well and have had no discomfort for 10 months, after being in misery for 8 years."

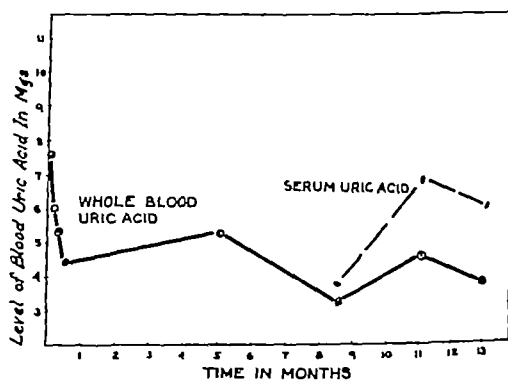


FIGURE 1 Case 1 Uric Acid Determinations before and during Treatment

Figure 1 gives the course of the uric acid determinations. One month after institution of treatment the level of uric acid was within normal limits. At 5 months it was only slightly above normal. A rise at the 11th month was thought to be due to a daily intake of beer.

**Case 2** A 54-year-old millwright was first seen in March, 1938. He was well until 5 months previously, when he had suffered an attack of pain in the right ankle. The pain came on suddenly one afternoon, and by night the weight of the bed clothing could not be borne on the foot. He was out of work 7 days, and by the end of 10 days his foot was normal. The second attack came on 1 month before he came to the clinic. It started in the left great toe and was followed the next day by involvement of the left knee. He suffered severely for 2 weeks and then gradually obtained relief.

On physical examination the patient was found to be obese, weighing 201 pounds. The only other finding of note was a violaceous swelling over the left great toe, with tenderness over the medial aspect. The significant laboratory finding was a uric acid determination of 8.4 mg per cent on the whole blood and 8.8 mg per cent on the serum. A roentgenogram of the great toe showed no bony change.

A diagnosis of gout was made and treatment instituted. It is now 7 months since the beginning of treatment. The patient has had no recurrence of his gouty episodes, and the level of the blood uric acid has remained within normal limits, as shown in Figure 2

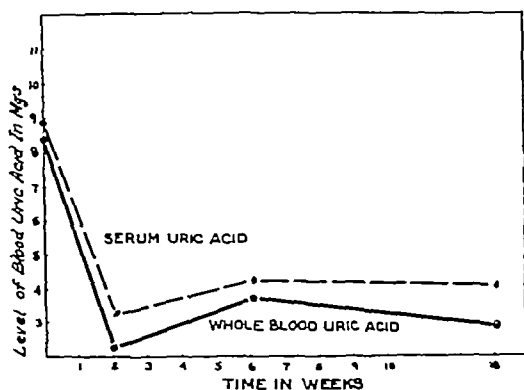


FIGURE 2 Case 2 Uric Acid Determinations before and during Treatment

Case 3 A 39-year-old, Jewish salesman was first seen in March, 1938. He had had recurring attacks, eight in all, of acute joint pains during a period of 5 years. The attacks came on suddenly and involved the feet, ankles or knees. In 24 hours the pain and swelling were severe enough to force him to bed and incapacitate him for 1 or 2 weeks. He suffered no residual discomfort after the attack subsided. The last attack began 2 weeks previous to his examination when the right elbow became painfully swollen

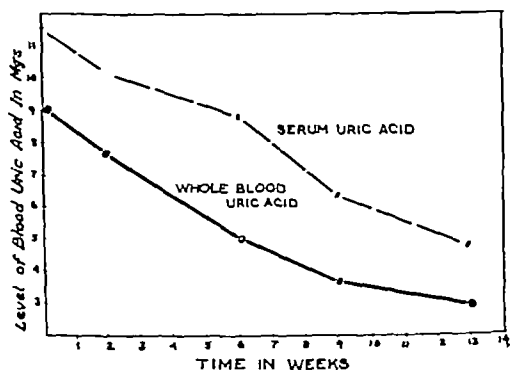


FIGURE 3 Case 3 Uric Acid Determinations before and during Treatment

and red, a day or so later the left foot was involved. His condition was improving when he was first seen at the clinic.

Physical examination revealed that the patient was short and stocky, weighing 174 pounds. The findings of note were in the right elbow and left foot. These joints were hot, red and painful to touch or forced motion. There was a white mass the size of a pea in both ears. A chemical test on the contents of one of these masses was positive for uric acid. The uric acid determination on the whole blood was 9.1 mg per cent and that on the serum 11.7 mg per cent. A roentgenogram of the foot revealed no abnormality.

A diagnosis of gout was made and treatment with the afore mentioned diet and cinchophen was instituted. During the following 3 months the patient had no further attacks, and Figure 3 shows a drop of the level of uric acid to normal.

Case 4 A 63-year-old naval officer was first seen in 1934. He had had three attacks of severe pain and swelling in one or the other great toe during the previous 10 years, the last one occurring 5 weeks before he came to the clinic. Relief was usually obtained by application of heat and rest of the foot. He had never suffered residual discomfort. Examination at that time showed him to be well developed but only fairly well nourished. The left great toe on its medial aspect was distinctly cyanotic and tender.

The uric acid determination on the whole blood was 5.4 mg per cent. A diagnosis of gout was made and wine of colchicum was prescribed. Local measures were also advised. Three days later the foot was normal and

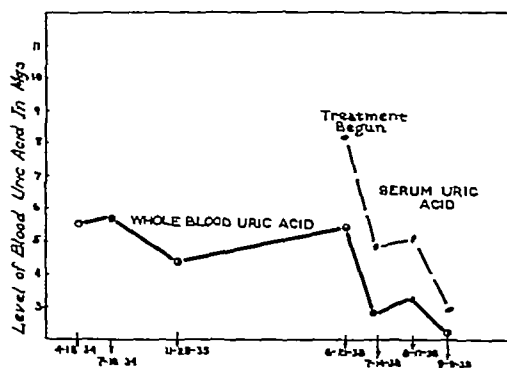


FIGURE 4 Case 4 Uric Acid Determinations before and during Treatment

the colchicum was discontinued. He returned 20 months later for a check up examination, he had not had any attacks in the interim. His physical examination was normal and the level of the blood uric acid was normal, being 4.3 mg per cent. At that time he was advised to take a low purine diet. He was seen periodically after this because of some mild functional gastrointestinal symptoms. In March, 1938, he had a recurrence of his gout, the right great toe being involved, the acute phase lasting 6 weeks. At the time of his examination in June there was still some residual tenderness of the right great toe. The uric acid determination on the whole blood was 5.2 mg and on the serum 8.1 mg. Treatment as used in the previous cases was begun. He has now been symptom free for 2 1/2 months. Figure 4 reveals the fall in the value for blood uric acid to normal.

#### COMMENT

The 4 cases reported illustrate our experience with the treatment of gout by a medical regimen consisting of low purine, low-fat and high-carbohydrate diet, with the administration of cinchophen. In these cases the plan accomplished the desired effects: prevention of further attacks of joint pain, and return of the blood uric acid to a normal level. The low-fat high-carbohydrate diet is not difficult to prepare and its satiety value is quite satisfactory.

The general directions for the diet are shown in Table 1. The amount of meat, fish or fowl to be

TABLE 1

GENERAL INSTRUCTIONS	
<b>Foods forbidden</b>	
Kidney liver sweetbreads sardines anchovies brains	
Alcoholic beverages	
Whole grain products such as whole wheat bread shredded wheat oatmeal	
Asparagus beans cauliflower peas lentils spinach mushrooms	
Condiments gravy meat soups meat extracts	
Butter cream mayonnaise fat-containing foods	
<b>Foods permitted</b>	
Milk (skimmed)	
Eggs	
Fruits	
Vegetables except as listed above	
Cereals except whole grain	
Cottage cheese	
Breads except whole wheat	
Jelly gelatin	
Potatoes rice macaroni spaghetti noodles	
Cocoa coffee Postum or tea — 1 cup a day	
<b>Meat Fish Fowl</b> (amount permitted depends on severity and progress of case)	
Beef (lean)	
Veal	
Chicken	
Herring	
Oysters	
Crab	
Cod	
Whitefish	
Bluefish	
Finnan haddock	
Tuna	
SAMPLE MENU	
<b>Breakfast</b>	
Fruit	Average serving
Cereal	Average serving
Egg	1
Milk (skimmed)	1 glassful
Toast	2 slices
Jelly or honey	2 tablespoonfuls
Sugar as desired	
<b>Dinner and Supper</b>	
Vegetable soup made without meat	
Lean meat	Small serving (as permitted)
or	
Egg	1
Potato rice, macaroni spaghetti or noodles	1 serving
Vegetables	½ cupful
Salad if desired	
Bread	1 slice
Jelly or honey	2 tablespoonfuls
Skimmed milk	1 glassful
Fruit	Average serving

utilized depends on the severity of the disease. These foods contain some purine but must be included to satisfy the patient. At the onset of treatment they are restricted to one serving two or three days a week, and are given more frequently until being given daily if the uric acid level permits. The sample menu contains 278 gm of carbohydrate, 77 gm of protein and 22 gm of fat, with a caloric content of 1618 calories. The amount of carbohydrate is increased in order to obtain

the caloric requirement for the patient. Because the diet is inadequate in vitamins A and B<sub>1</sub>, haliver oil and thiamin chloride must be supplemented. Patients frequently lose weight in the beginning of treatment until they learn to consume sufficient carbohydrates to make up for the calories lost in the elimination of fat from the diet.

Many authors have feared the continued use of cinchophen because of its possible toxic effect on the liver. We agree with Hench,<sup>4</sup> who believes that the danger of cinchophen is far less than has been feared, that it is more a matter of individual susceptibility of rare occurrence than of a universal poison, and that the benefit from its careful use outweighs its possible harmful effects. The high-carbohydrate diet may tend to act as a guard against any toxic action on the liver. Needless to say, patients at the onset of treatment are advised to discontinue the cinchophen if they notice any ill effect such as an irritation or discoloration of the skin or stomach distress. Cinchophen plays its role by increasing the uric acid excretion in the urine. Recent work by Grabfield<sup>10</sup> suggests that this action is on the sympathetic nerves which supply the kidneys.

## SUMMARY

Four cases of gout are presented in which symptomatic relief and a falling of the blood uric acid to normal were obtained by a plan of treatment consisting of a low-purine, low-fat, high-carbohydrate diet, with cinchophen. These results warrant further investigative utilization of such a plan in a larger series of patients.

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## MENINGITIS SECONDARY TO SUBACUTE BACTERIAL ENDOCARDITIS\*

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**M**ENINGITIS occurring during the course of subacute bacterial endocarditis has been reported from time to time, but is by no means a commonly recognized complication of this disease,‡ so frequently punctuated by embolic phenomena. When the long list of conditions with which this form of endocarditis has been confused is compiled, meningitis is rarely included. Blumer,<sup>1</sup> in his excellent monograph on subacute bacterial endocarditis, enumerates twenty-one diseases which must be considered in a differential diagnosis, but meningitis is not mentioned. The present paper summarizes the 32 cases of meningitis secondary to subacute bacterial endocarditis which are recorded in the literature, and adds 3 new ones which emphasize this little-recognized manifestation of a disease well known for its protean symptomatology.

### REVIEW OF THE LITERATURE

A few well-known authors have mentioned the possibility of meningitis or meningitic symptoms that occur during the course of subacute bacterial endocarditis. Osler,<sup>14</sup> in 1909, while discussing chronic infectious endocarditis spoke of cases showing predominant meningitic symptoms, but went into no further detail. In 1917 Debré<sup>5</sup> divided subacute bacterial endocarditis into ten "formes," the sixth of which was called the "nervous" type with meningitic or spinal symptoms. Tice<sup>15</sup> in his *Practice of Medicine* writes of the cerebrospinal manifestations of this disease, characterized chiefly by headache. He mentions embolic meningitis and says that "in a few instances the *Streptococcus viridans* has been cultured from the spinal fluid." When in 1923 Blumer<sup>1</sup> summarized the causes of death in 193 patients with subacute bacterial endocarditis, he found that only 2 of them had terminal symptoms of meningitis. Finally in 1925 Libman,<sup>9</sup> discussing the prognosis in subacute bacterial endocarditis, stated in a footnote that meningismus was a much neglected but valuable symptom of

this disease. Seven years earlier he<sup>8</sup> had shown how extensive hemorrhages into the brain, ventricles or subarachnoid space might occur from rupture of embolic aneurysms and how these hemorrhages could produce a symptom complex resembling meningitis, but with a bloody spinal fluid. Other textbooks and monographs recognize meningitis as a complication of acute bacterial endocarditis when the staphylococcus, pneumococcus or hemolytic streptococcus is the causative organism, but they fail to mention meningitis occurring during the course of subacute bacterial endocarditis caused by *Streptococcus viridans*.

When the literature is searched for reports of cases of meningitis secondary to subacute bacterial endocarditis, only 32 cases can be found. Many of these are incomplete, lacking bacteriological findings or adequate history. Autopsies are reported on only 11 cases. One of the earliest reports, by Claude<sup>4</sup> in 1918, was that of a boy who developed meningitic signs during the course of endocarditis. The spinal fluid contained many polymorphonuclear leukocytes, and at autopsy, evidence was found of a mild meningitis with underlying softening of the brain. Streptococci were found in the vegetations on the heart valves.

Oille, Graham and Detweiler<sup>13</sup> in 1915 first identified *Streptococcus viridans* in the spinal fluid in a case of meningitis secondary to subacute bacterial endocarditis. From then on, sporadic cases are found in the literature (Table 1) until Neal and her colleagues<sup>12</sup> in 1936 published a large series of cases which they had seen in consultation because of their resemblance to cases of epidemic meningitis, poliomyelitis or encephalitis. Fifteen of their cases had meningitic symptoms alone and 3 had them in combination with paralyses. In 5 cases *Streptococcus viridans* was cultured from the spinal fluid, 4 had signs of meningeal irritation from subarachnoid hemorrhage, and 2 of these proved to be meningismus—signs of meningeal irritation without any abnormal findings in the cerebrospinal fluid. It is only because the authors were specialists in meningitis and saw many cases in consultation that they were fortunate enough to examine so large a group of this little recognized complication of subacute bacterial endocarditis.

The following 3 cases are of interest because in 1 the meningitic symptoms twice developed while

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In commenting on Case 24391 of the Case Records of the Massachusetts General Hospital (New Eng J Med 219:493-494, 1938) Dr. Paul D. White states: "This is the first case of subacute bacterial endocarditis that I have known to have been complicated by a meningitis; the cases seen in this hospital that have shown more clear proof should be reported in the literature which as yet has little to say on the subject."

the patient was under observation for other manifestations of subacute bacterial endocarditis, and in the other 2, meningitis was the first recognized symptom of a bacteremia which was not suspected until after treatment had been instituted, for meningococcus meningitis in 1 case and tuberculous meningitis in the other

# CASE REPORTS

*Case 1* R. H. (No 104738), a 41 year-old, white woman, had always been well until December, 1934

day she was readmitted in a stuporous condition to one of the urological services of the New York Hospital, where at first uremia was suspected.

Examination on admission showed a thin, acutely ill woman, who was drowsy and delirious. She could be roused with difficulty and then her only complaint was headache. The temperature was 104°F, pulse 138, and respirations 28, full and deep. Two petechial hemorrhages were found in the left lower conjunctival sac, and there was blurring of both optic disks. The neck was stiff. A few rales were heard at the apex of the left lung. The heart was not enlarged, but a systolic murmur was heard, localized at the apex. This murmur had been

TABLE 1 Summary of Reported Cases

DATE	AUTHOR	MENTINGEAL SYMPTOMS AND SIGNS	BLOOD CULTURE	CUL. TURE	SPINAL FLUID CELL COUNT	POLYMORPHO-NUCLEARS	SUGAR	CONDITION OF BRAIN AT AUTOPSY AND REMARKS
1910	Steinert <sup>17</sup>	Typical meningitis			+	+		No cause of meningitic symptoms found
1915	Oille et al. <sup>18</sup>	Pain with no signs	+	+	+	+		
1918	Claude <sup>4</sup>	Typical meningitis and hemiplegia			+	+		Mild meningitis softening streptococci on heart valves
1920	Lereboullet and Mouzon <sup>7</sup>	Typical meningitis			50			Hemorrhage
1920	Fiessinger and Janet <sup>6</sup>	Headache	+		32			Congestive type of meningitis
1925	Waldman and Kahn <sup>20</sup>	Typical meningitis						
1926	Cabot <sup>2</sup>	Typical meningitis and hemiplegia		0	860	70%		Edema of pia and softening
1927	Mascheroni and Tourreilles <sup>10</sup>	Typical meningitis	+	0	184	+		
1929	Ullom <sup>19</sup>	Typical meningitis	0	0	614	16%		Serum given empirically
1929	Weisenburg <sup>21</sup>	Symptoms only			6			Reactive serous meningitis
1934	Merklen and Israel <sup>11</sup>	Typical meningitis	+	0	17	50%		Edema of pia and softening
1935	Ramond <sup>12</sup>	Typical meningitis	+	0	304	+		
1936	Caselli and Huber <sup>3</sup>	Typical meningitis	0		80			
1936	Neal et al. <sup>13</sup>	Typical meningitis		+	+	+	D	
		Typical meningitis		+				
		Pain with no signs		+	550	+	D	
		Typical meningitis		+	5	0	N	
		Typical meningitis	+		+	+	D	
		Mild signs		0	720	30%	D	Meningeal edema
		Mild signs			+	90%	N	
		Typical meningitis	+	0	7250	+	N	Blood culture positive for gonococcus
		Meningitis and hemiplegia	+	0	1650	+	N	Subsiding meningitis and infarcts
		Typical meningitis			Bloody			
		Typical meningitis			Bloody			
		Headache			Bloody			
		Typical meningitis		0	0	0		
		Typical meningitis		0	0	0		
		Paralysis and meningitis	+	+			D	
		Paralysis and meningitis	+		+	+	D	Emboli and softening
		Paralysis and meningitis	+		1800	+		

+ = positive or increased 0 = negative or absent N = normal D = decreased

(7 months before her first admission), when she began to lose weight, be easily fatigued and to act strangely, becoming very religious and neglecting her family. She became depressed and at times irrational. She had periods of vomiting and in a few months developed ankle edema. Her family physician, telling her that she had a fever and heart trouble, put her to bed. Finally on July 27, 1935, she came to the New York Hospital clinic, complaining chiefly of urinary frequency, nocturia and dysuria. She had lost over 40 pounds during that spring. Hospitalization was advised, and after necessary study, renal tuberculosis was diagnosed and a left nephrectomy was performed. X-ray study of the chest at that time was negative for tuberculous infiltration, but tubercle bacilli were demonstrated in the removed kidney.

The patient made an uneventful recovery and went home. One month later, October 23, 1935, she suddenly became weak and lapsed into unconsciousness. The next

present during the previous admission. The liver edge was 6 cm below the costal margin, but the spleen could not be felt. Tendon reflexes were symmetrically hyperactive and there was a positive Kernig sign bilaterally, as well as a Brudzinski neck sign.

Examination of the urine showed 2+ albumin with many white cells and a few red cells in the sediment. Tubercle bacilli were subsequently isolated from the urine, but only by guinea pig inoculation. There was a hypochromic anemia with 3,100,000 red-blood cells and 53 per cent hemoglobin, and a moderate leukocytosis (12,000) with 60 per cent adult and 15 per cent immature polymorphonuclears. The blood Wassermann was negative and the nonprotein nitrogen 32 mg per cent. The cerebrospinal fluid was under increased pressure and contained 200 white cells, 90 per cent of which were polymorphonuclears. The sugar content of the spinal fluid was reduced to 39 mg per cent, and the total protein was

increased. No organisms could be demonstrated by smear or culture of the spinal fluid. A portable x-ray of the chest showed a diffuse mottling with miliary distribution. From these observations it was thought that the patient had miliary tuberculosis with tuberculous meningitis, and she was transferred to the tuberculosis service. Repeated spinal drainage was the only form of therapy, and in a few days she became rational and the signs of meningeal irritation gradually disappeared. She continued, however, to have a low grade fever. Neurological examination during the 2nd week in the hospital disclosed stiffness of the left arm with marked astereognosis of the left hand as well as definite mental changes. It was supposed that she had a brain abscess in the right parietal lobe. An x-ray of the chest taken during this week showed complete disappearance of the mottled shadows seen on admission. At the end of the 2nd week the first positive blood culture report was received,—a non hemolytic streptococcus,—but it was not until the end of the 6th week that more petechiae appeared and the

culosis and the presence of miliary mottling on x-ray of the lungs. Subacute bacterial endocarditis was not diagnosed until the blood culture showed non hemolytic streptococci. The subsequent course was characteristic in the development of a palpable spleen and the appearance of petechiae—two of which had been noticed on admission, although their true significance was not realized. The autopsy showed a bacterial endocarditis and evidence of a meningitis as well as bilateral areas of softening in the brain.

*Case 2* W. D. (No. 67597) a 16-year-old schoolboy, was admitted to the Second (Cornell) Medical Division, Bellevue Hospital, August 22, 1936, complaining of severe headache of 3 days duration. During the previous month he had suffered from frequent attacks of frontal headaches associated with generalized malaise. Three days before admission the headache became more severe and he had sensations of chilliness. The following day he lost his appetite, vomited twice and for the first time complained of a stiff neck. On the day of admission the stiffness of the neck became more marked and the headache unbearable, and slight noises became very irritating.

On admission to the hospital the patient appeared acutely ill, lying in a position of opisthotonus, extremely irritable and overactive. He was moaning and talking incessantly. His temperature was 104°F, pulse 92, and respirations 34. The skin was clear and no petechiae were found. The heart was markedly enlarged to the left, the apical impulse being at the anterior axillary line in the 7th interspace. The first apical sound was loud and slapping and was followed by a rough systolic murmur. A diastolic rumble with presystolic accentuation was heard at the apex. The second pulmonic sound was accentuated. The liver and spleen were not felt. The tendon reflexes were symmetrically equal. Distinct neck Brudzinski and bilateral Kernig signs were present.

Urinalysis was normal except for a few red cells and leukocytes in the standing sediment. The blood count showed no anemia and 16,000 white cells, of which 68 per cent were adult and 20 per cent immature polymorphonuclears. An electrocardiogram revealed only a sinus tachycardia and notching of the P waves, often seen in association with mitral stenosis. A chest x-ray film showed a diffusely enlarged heart of a shape characteristic of double mitral valvular disease.

A lumbar puncture done shortly after admission produced a turbid, gray spinal fluid under increased pressure. It contained 1600 white cells, chiefly polymorphonuclears. The culture of this and of all subsequent spinal fluid specimens was negative, but direct smear of the first specimen showed a few cocci in pairs and chains. These were never found again. A blood culture taken on admission remained sterile. The preliminary diagnosis was rheumatic heart disease and epidemic meningitis.

The treatment consisted of spinal drainage twice a day and the administration of antimeningococcus serum, a total of 260 cc. being given intrathecally during the first 4 days. For the next 4 days spinal drainage was done once daily and no further serum was given. During the first 4 days the temperature gradually fell to a level between 101 and 102°F, where it remained for the rest of the course. The patient improved symptomatically in a few days.

In spite of the disappearance of meningeal symptoms, fever around 102°F persisted. Tenderness of the finger tips developed, but blood cultures were negative until September 15, 3 weeks after admission when *Streptococcus viridans* was first isolated. This was confirmed on six subsequent cultures taken from time to time until death. The patient had no further symptoms except occasional

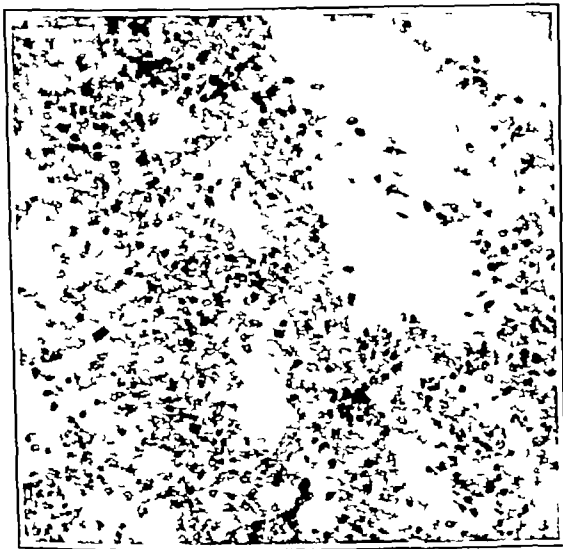


FIGURE 1 Case 1

Section of brain showing meningitis with cellular exudate containing polymorphonuclear leukocytes and round cells (X 185)

spleen was first felt. The patient's course was slowly downhill, the temperature rising almost daily to 103°F. On the 53rd hospital day she suddenly became paralyzed on her right side and died 4 days later. At autopsy the pertinent findings were vegetative endocarditis of the mitral and aortic valves (non hemolytic streptococcus, gamma type), infarcts of the kidney, spleen and left lung, purulent meningoencephalitis, fibrous calcified scars in the upper lobes of both lungs and tuberculosis of the bladder and left ureter. The pia arachnoid membrane was thickened and milky over both hemispheres of the brain, and there was distinct encephalomalacia in the areas of the right and left insulae. Microscopic examination (Fig. 1) showed meningitis with a cellular exudate containing polymorphonuclear leukocytes. Associated with this condition was encephalitis with collections of small round cells in the perivascular spaces of some of the cortical vessels.

*Comment* This case was diagnosed as tuberculous meningitis in the light of a recent nephrectomy for tuber

periods of tenderness of the fingertips, lasting a few days each until October 13, when a bout of severe generalized abdominal pain, accompanied by vomiting and a chill, suggested either splenic or mesenteric infarction. This condition subsided spontaneously after a few days and the patient was fairly comfortable until October 28, 2 months after the subsidence of the meningitis, when he developed a right hemiplegia. From this point on, the course was steadily downhill, in spite of an intensive course of bacteriophage given intravenously twice daily for 1 month. Petechiae appeared sporadically, and the spleen became palpable. Just before death the patient developed signs and symptoms of a fresh intracranial accident. He died on December 8, the 108th hospital day. Permission for autopsy was refused. Incidentally, Dr Josephine Neal saw this case in consultation after the positive blood culture had been reported, and she agreed that the meningitis was probably secondary to a pre-existing subacute bacterial endocarditis.

**Comment** This patient entered the hospital because of meningitic symptoms and was treated on a presumptive diagnosis of meningococcal meningitis until 20 days after admission, when blood cultures first showed *Streptococcus viridans*. The subsequent course was typical of subacute bacterial endocarditis. Intensive bacteriophage therapy did not alter the fatal course.

**Case 3** M S (No 93693) a 19 year-old Negress, was admitted to the Second Medical Division, Bellevue Hospital, July 20, 1937, complaining of joint pains of 3 or 4 months' duration. She first had rheumatic fever at the age of 7, at which time she was a patient in Harlem Hospital. At 8 and at 11 she suffered from recurrent bouts of polyarthritides with fever. During her first illness she was told that she had heart trouble, and although she never had dyspnea or ankle edema, she was kept out of gymnasium at school. Her tonsils were removed at the age of 11.

In March, 1937, the patient began to have migratory joint pains, but continued her work as a student. Toward the end of June she had a tooth extracted. One week later she went to bed with a headache, fever and precordial pain not related to exercise. On July 13, 1937, she was admitted to the Hospital for Joint Diseases because of the pains in her legs. Severe pain in the right calf, radiating to the foot, suddenly developed, and this was her chief complaint when she was transferred to Bellevue Hospital 1 week later.

Examination on admission showed a well-developed and well-nourished Negress with a moderate fever. She appeared acutely ill. One petechial hemorrhage was found in the lower right conjunctival sac. The heart was enlarged to the left, systolic and diastolic thrills were felt at the apex, where the apical impulse was diffuse and heaving. A harsh systolic murmur radiating to the left axilla was heard at the apex, where there also was a localized crescendo presystolic murmur. There was spasm and tenderness in the left upper quadrant of the abdomen, though no masses or viscera were felt. There was tenderness in the right calf and the right dorsalis pedis pulse was absent. Tendon reflexes were hyperactive and symmetrical. The diagnosis on admission was subacute bacterial endocarditis, with arterial embolism in the right leg.

Examination of the urine was normal except for a few red cells. The blood count showed a moderate anemia and 6300 white cells, with 64 per cent adult and 18 per cent immature polymorphonuclears. The blood Wassermann was negative, and the electrocardiogram showed only

a sinus tachycardia. An x-ray film of the chest showed a diffusely enlarged heart.

The temperature rose daily to about 103°F. The pain in the right calf gradually subsided, and after a few weeks the dorsalis pedis pulsation returned. Transient petechiae were noted, and there were occasional sharp pains over the spleen. Repeated blood cultures, however, were negative until August 10, 3 weeks after admission, when *Streptococcus viridans* was isolated.

Two days later the patient became drowsy, vomited twice and complained of occipital headache. She developed a stiff neck and a positive Kernig sign bilaterally, and the temperature rose to 105.4°F. Meningitis was diagnosed. Lumbar puncture produced a cloudy pink fluid under increased pressure. The fluid contained 3800 white cells, 90 per cent of which were polymorphonuclears. *Streptococcus viridans* was isolated from this fluid by



FIGURE 2 Case 3

Section of cerebral cortex showing meningitis with infiltration of polymorphonuclear leukocytes and round cells as well as local edema (X 200)

smear and culture. The patient was given sulfanilamide by mouth and daily spinal drainages, under which regimen the spinal fluid gradually became clear, the temperature dropped until it was normal by August 23 (11 days after the onset of the meningitis), and the stupor gradually cleared. The girl was then up in a chair and afebrile, with transient diplopia her only complaint, until October 16. At that time blood cultures again became positive for *Streptococcus viridans*, and painful spots developed in the fingertips and toes—Osler's nodes. On November 9, nearly 3 months after the first attack of meningitis, the patient again developed signs of meningeal irritation and became febrile and stuporous. The spinal fluid was cloudy and contained 2000 leukocytes, 80 per cent being polymorphonuclears. In spite of the repeated use of sulfanilamide the patient died on November 14, the 119th hospital day.

At autopsy the pertinent findings were vegetative endocarditis of the mitral valve and adjacent area in the left auricle, infarcts of the spleen and kidneys, and evidence of old meningitis and recent hemorrhage in the brain. The



leptomeninges on the dorsal aspect of the right temporal lobe, right frontal lobe and optic chiasm were dull and finely granular. There was subarachnoid blood between the cerebellum and the medulla. In the right parieto-occipital region there was a depression and an area of softening about 8 cm in diameter. On sectioning, this was found to contain about 75 cc of firmly clotted blood. There was clotted blood in both lateral ventricles and in the aqueduct of Sylvius, but not in the spinal canal. Microscopic examination (Fig 2) showed a meningitis with infiltration of polymorphonuclear leukocytes and round cells as well as local edema.

**Comment** This is a definite case of subacute bacterial endocarditis which, while on the ward, developed a *Streptococcus viridans* meningitis which was apparently cured by sulfanilamide and daily spinal drainage. The patient was well for two months before another episode with meningitic symptoms appeared and proved fatal. Autopsy showed typical findings of subacute bacterial endocarditis with visceral infarcts. The brain showed evidence of an old basilar meningitis, encephalomalacia and recent subarachnoid hemorrhage.

#### DISCUSSION

The mechanism by which meningitis is produced in subacute bacterial endocarditis probably is fairly simple. Small pieces of vegetation or masses of bacteria from the heart valve break loose and are carried in the blood stream to the vessels of the brain. Here mycotic (infected) aneurysms may form, either from involvement of the vessel wall or of the wall of the artery directly from its lumen. These aneurysms may rupture, causing a hemorrhage into the brain substance or into the subarachnoid space. Then the presence of blood in the cerebrospinal fluid produces meningeal irritation. On the other hand, the emboli from the heart may produce thromboses of the smaller or larger vessels of the brain, and around these areas encephalomalacia occurs, either from invasion of leukocytes or from actual multiplication of organisms. This process varies from slight softening to complete destruction and formation of abscesses. If one of these infarcted areas should rupture into the subarachnoid space, organisms may be found in the spinal fluid, showing that a true bacterial meningitis exists. Even without rupture, meningeal irritation may occur in the membranes over a superficial area of softening, and a localized meningitis may be produced with bacteria appearing in the spinal fluid. Finally, congestion of the pia arachnoid membrane may arise secondary to more deeply located infarcts, producing a serous meningitis with no organisms in the spinal fluid.

One of the interesting features of bacterial meningitis secondary to subacute bacterial endocarditis is that it usually subsides spontaneously, or in spite of any treatment. This is probably because the causative organisms are of low virulence and are easily overcome by the local defense mecha-

nisms. Were it not for the growth of bacteria on an already damaged heart valve, the body would doubtless be able to handle the bacteremia successfully. In most cases where meningeal symptoms immediately precede death in subacute bacterial endocarditis, as in the second episode in Case 3, they are caused by a hemorrhage, rather than being true bacterial meningitis. In this case it is hard to believe that sulfanilamide had anything to do with the subsidence of the first meningeal episode, and it is easy to see why it had no effect on the terminal meningitis which autopsy showed was caused by blood in the subarachnoid spaces.

Subacute bacterial endocarditis should be kept in mind when in a case of meningitis a heart murmur is present, petechiae are found and a cloudy spinal fluid contains no demonstrable organisms. (This does not alter the rule, however, that antimeningococcus serum should be given empirically to every case of meningitis with a cloudy spinal fluid until culture shows that some organism other than meningococcus is the cause. Further experience with sulfanilamide may change this rule.) In the first case presented, the circumstantial evidence of a recent nephrectomy for tuberculosis of the kidney and a suggestive portable chest x-ray film directed the diagnosis toward tuberculous meningitis, although the spinal fluid was not typical of this disease and although petechial hemorrhages and a systolic heart murmur had been noted. In the second case, a mitral stenosis was diagnosed on admission, but the importance of the chains of cocci in the spinal fluid was minimized until twenty days later, when the blood culture first showed a streptococcus. In atypical cases of meningitis, therefore, a correct diagnosis may sometimes be reached early in the course, if subacute bacterial endocarditis is remembered as a possible cause.

#### SUMMARY AND CONCLUSIONS

Meningitis is an unusual manifestation of subacute bacterial endocarditis, although it has been recognized as such for many years.

Only 32 cases of meningitis secondary to subacute bacterial endocarditis have been reported.

Three additional cases are reported in this paper, 1 occurring during the classical course of subacute bacterial endocarditis, 1 with the admitting diagnosis of meningococcal meningitis, and 1 being admitted as tuberculous meningitis.

The pathologic processes by which meningeal irritation may be produced in subacute bacterial endocarditis are discussed briefly.

*Streptococcus viridans* meningitis in subacute bacterial endocarditis is usually of short duration and subsides spontaneously.

periods of tenderness of the fingertips, lasting a few days each until October 13, when a bout of severe generalized abdominal pain, accompanied by vomiting and a chill, suggested either splenic or mesenteric infarction. This condition subsided spontaneously after a few days and the patient was fairly comfortable until October 28, 2 months after the subsidence of the meningitis, when he developed a right hemiplegia. From this point on, the course was steadily downhill, in spite of an intensive course of bacteriophage given intravenously twice daily for 1 month. Petechiae appeared sporadically, and the spleen became palpable. Just before death the patient developed signs and symptoms of a fresh intracranial accident. He died on December 8, the 108th hospital day. Permission for autopsy was refused. Incidentally, Dr. Josephine Neal saw this case in consultation after the positive blood culture had been reported, and she agreed that the meningitis was probably secondary to a pre-existing subacute bacterial endocarditis.

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At autopsy the pertinent findings were vegetative endocarditis of the mitral valve and adjacent area in the left auricle, infarcts of the spleen and kidneys, and evidence of old meningitis and recent hemorrhage in the brain. The

It is in this type that injection treatment is ideal. With increase in size the masses may become large enough to prolapse through the external sphincter. Sometimes internal and external piles are combined. In these cases the mucous membrane of the anal canal is undermined by varicosities and may slide down, to bring the pectinate line outside the anal orifice. Operative treatment is preferable for these patients.

Classification of the various types of hemorrhoids encountered in the clinic is given in Table 2. It

TABLE 2 *Classification of Cases*

DIAGNOSIS	NO. OF CASES
Internal hemorrhoids	25
Internal hemorrhoids thrombosed	3
External hemorrhoids	6
External hemorrhoids thrombosed	46
External thrombosis with external piles	12
Combined hemorrhoids	52
Total	136

can be seen that there was a great preponderance of uncomplicated internal hemorrhoids, the type suited to treatment by injection.

#### INCIDENCE

The highest incidence of hemorrhoids is between the ages of forty and fifty. This is shown in Table 3. Two hundred and thirty-four pa-

TABLE 3 *Age Distribution*

AGE	NO. OF CASES	AGE	NO. OF CASES
0-9	0	40-49	109
10-19	3	50-59	4
20-29	61	60-69	33
30-39	85	70-79	8
Total		136	

tients, or 62 per cent, were men, and 142 or 38 per cent, were women.

#### SYMPTOMS

Bleeding is the commonest symptom of internal hemorrhoids. It was present in 82 per cent of our cases, either alone or in combination with other symptoms. The blood varies in amount from a few drops to several ounces, is bright-red and not clotted, usually comes after a constipated movement and is due to the pressure of hard feces that breaks a varicosity. Invariably it stops spontaneously. In severe cases bleeding may be repeated with every movement for days, even weeks, the patient coming to the clinic with severe secondary anemia. This, however, is rare; there were not more than 2 or 3 of our patients who had noticeable secondary anemia from bleeding hemorrhoids—in 1 case the hemoglobin was 30 per cent.

Protrusion is the other common symptom of internal hemorrhoids; it was present in 46 per cent of our cases. It usually occurs during bowel movements, and in most of the cases is reduced spontaneously at the end of defecation. In more advanced cases, it has to be replaced manually by the patient, and in a few cases of combined external and internal hemorrhoids it remains unreduced. In these instances the patient complains of constant "leakage," which is due to mucous secretion from the exposed mucous membrane covering the prolapsed internal piles.

Pain is very rare in uncomplicated internal hemorrhoids. It was present in only 4 per cent of our cases. On the other hand, it is the main symptom of an external thrombosed pile and was present in every one of 55 such cases in our series. Pain is also very severe in cases with thrombosis of an internal pile accompanied by prolapse and strangulation. These cases, however, are not common.

Pruritus existed in about 2 per cent of the patients, but we believe this was a coincidence rather than a symptom of the disease. Constipation was present in an undetermined number, but cannot be considered as entirely due to the hemorrhoids.

#### TREATMENT OF INTERNAL HEMORRHOIDS

As previously mentioned, internal hemorrhoids are composed of a plexus of small, thin-walled vessels embedded in loose areolar tissue. They may be treated by injection or by surgery. The aim of injection treatment is to introduce an irritating solution into this areolar tissue which will spread around the thin-walled veins. This irritating substance causes an inflammatory reaction with swelling and subsequent proliferation of fibrous tissue. The swelling tends to obliterate the blood vessels, with resultant reduction in size of the hemorrhoid and relief from bleeding. Later contraction of scar tissue makes the result permanent or semi-permanent. Injection treatment does not always result in a cure.

*Technic of Injection.* The patient lies in the right Sims's position, and with his left hand elevates the left buttock, thus facilitating exposure of the anus. The operator sits on a stool at the side of the table facing the patient's buttocks, his line of vision level with the operative field. A student's stand lamp placed between the operator's feet and reaching the level of his chin supplies adequate illumination.

Digital examination is first performed, using the left index finger covered with a rubber cot. If an inflammatory lesion is found, such as a fissure, fistula or acute cryptitis, no injection should be

Subacute bacterial endocarditis should be thought of in the differential diagnosis of meningitis

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## HEMORRHOIDS\*

### With Special Reference to Injection Treatment

ROY E. MABREY, M.D.,† AND GEORGE S. SPEARE, M.D.†

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PATIENTS suffering from bleeding or protruding hemorrhoids can usually secure relief without operation. Since the Rectal Clinic was established at the Massachusetts General Hospital in 1928 the number of rectal operations has dropped markedly. Most of the patients are now treated in the clinic without loss of time and without taking up hospital beds.

Hayden<sup>1</sup> has described the treatment of internal hemorrhoids by injection, and Balch<sup>2</sup> has reviewed the results at the Massachusetts General Hospital for 1930-1932.

In the past two and a half years a series of 862 patients were seen in the Rectal Clinic of the Out Patient Department. There were 376 cases of hemorrhoids. Table 1 shows the relative frequency of the various conditions encountered in this large clinic. This paper is concerned only with a study of the 376 cases of hemorrhoids with especial reference to injection treatment.

#### CLASSIFICATION

The anatomy of the anus as described in various books of anatomy needs no elaboration here. Hemorrhoids are divided into the external and internal varieties. External hemorrhoids are covered with skin, and are visible and sometimes palpable around the anal margin. These usually give no symptoms and cause very little inconvenience except for an occasional thrombosis or interference with anal hygiene. They should never be injected with sclerosing solutions. Due to the sensory nerve supply of the overlying skin and low vascularity, injection of external piles causes severe pain and usually necrosis.

TABLE 1 Diagnosis among 862 Consecutive Cases

DIAGNOSIS	NO OF CASES	DIAGNOSIS	NO OF CASES
Hemorrhoids	376	Polyp (adenomatous)	3
Pruritus	134	Polyp (squamous)	3
Anal fissure	179	Anal carcinoma	2
Anal fistula	57	Polypsosis	2
Carcinoma	27	Blind fistula	1
Study (no disease)	25	Lax sphincter	2
Perianal abscess	11	Bleeding (? cause)	2
Colitis	11	Tight sphincter	2
Cryptitis	11	Hypertrophied papilla	2
Pain	10	Foreign body	1
Melanosis coli	8	Prolapse	1
Proctitis	8	Lax perineum	1
Traumatic irritation	5	Cyst of anal margin	1
Constipation	5	Fecal impaction	1
Stricture (postoperative)	5	Amebic colitis	1
Condyloma	4	Obstructing prostate	1
Diverticulitis	4	Pectenosis	1
Lymphogranuloma inguinale	4		

Internal hemorrhoids are soft masses of varicose veins embedded in areolar tissue and covered with mucosa. They extend from the pectinate line upward into the rectum for about 3 cm. They vary in size, and in well-developed cases may become confluent, so that only two or three large piles are distinguishable. As the vessels dilate there is a tendency for the mucous membrane to become thin and granular, resembling a mulberry in appearance. These piles bleed on the slightest trauma.

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patients experienced no relief or had recurrence of symptoms and required subsequent treatment, either more injections or an operation. The injection treatment does not effect a radical cure but relieves the patient of symptoms and can be repeated as often as necessary. These figures are based on the assumption that patients who did not return were relieved of symptoms.

There was an abrupt decrease in the number of primary operations after the introduction of injection treatment. They decreased from 42 in 1929 to 5 in 1932. Since that time there has been a steady increase. This is due to the fact that we are now better able to judge the limitations of injection treatment.

#### TREATMENT OF EXTERNAL HEMORRHOIDS

There were 46 patients who had thrombosed external hemorrhoids. Half of these were operated on in the clinic. The rest were advised to take sitz baths and mineral oil, or required no treatment. Our policy in this condition is to operate

on the early painful cases. Under novocain an elliptical wedge of skin is removed from above the pile and the clot is shelled out. In patients who have mild symptoms and do not come in until the clot is several days old we either advise hot baths and mineral oil or give no treatment.

#### SUMMARY AND CONCLUSIONS

Three hundred and seventy-six cases of hemorrhoids are reviewed. Seventy-seven per cent of our cases of uncomplicated internal hemorrhoids were suitable for injection treatment. Of these, 81 per cent were completely relieved of symptoms for varying periods up to two years. The remainder experienced no relief or had recurrence of symptoms that required more injections or operation.

Injection treatment is simple and effective and is carried out as an ambulatory procedure.

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## REPORT ON MEDICAL PROGRESS

### ENDOCRINOLOGY

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THE current literature concerning the glands of internal secretion is very large, and deals particularly with the physiological effects of the more recent, purified extracts. Much of this work is controversial and, therefore, difficult to evaluate. These preparations are largely derived from the gonads and from the anterior pituitary glands, and the extent of their clinical value is not yet completely clear. However, it is obvious that many of them are very potent.

When a drug has little pharmacological effect, its indiscriminate use is attended with little danger, but the converse is also true—the more effective the drug, the more discriminately must it be used. This is well exemplified in the purified hormones which are now available. It was not so long ago that simple dried gland preparations were the only ones obtainable. With the exception of the thyroid gland preparations, these exerted but a feeble influence. For instance, sometimes dried ovarian extract appeared to have an effect, though more frequently it seemed to

exert no obvious influence. Under these conditions, it made little difference whether the therapeutic indications for its use were correct or not. More potent endocrine drugs have now become available, and because of this, their use must be more carefully circumscribed. When an active preparation of the ovarian follicular hormone is used, it may have widespread effects: not only does it reduce the number of "hot flashes" for which it may have been prescribed, but it also has a stimulating effect on the uterus, the uterine endometrium and the breasts and a complicated inhibition of the functioning of the pituitary gland, all of which must be considered. The use of other hormones is complicated by just such widespread effects. Instead of simple, dried ovarian gland, one must now decide whether it is wiser to use the follicular hormone, the corpus luteum hormone or the sex-stimulating hormone of the anterior pituitary gland. All these have very different effects and, therefore, the indications for their use must be clear and distinct.

The more potent the drug, the more important

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carried out until these have been corrected. Uncomplicated internal hemorrhoids are not as a rule palpable by digital examination.

A fenestrated anoscope, well covered with a greasy lubricant, is next introduced into the anus, and is pushed in as far as it will go before removing the obturator. This is necessary because in many cases the mucocutaneous line is deeply placed. This line can be readily identified by the alternating papillae and crypts about 2 or 3 cm from the anal margin. If an internal hemorrhoid is present in that quadrant, it will bulge into the window of the speculum.

The pile is wiped with a dry swab and cleaned with soap solution. Complete sterilization is impossible, and the use of iodine or other antiseptics is unnecessary. The danger of infection is negligible. We have not seen an abscess result, despite insufficient sterilization of the area of needle puncture. In the presence of known infection, injection should be postponed.

Using a 5-cc syringe filled with a solution of 5 per cent quinine and urea hydrochloride and fitted with a 26-gauge needle 4 cm long, the pile is punctured and 10 to 1.5 cc of the solution is injected directly into the center of the hemorrhoidal mass at a depth of 0.3 to 0.8 cm from the surface of the mucous membrane, according to the size of the pile. The needle puncture should be made 0.6 cm or more above the mucocutaneous line, and care should be taken not to inject either the submucous area, the outer wall of the bowel or the pararectal tissues. Submucous injection is likely to result in a slough, while injection into the bowel wall or pararectal tissue may produce a serious infection in the pelvis.

After the injection is completed, the obturator is replaced and the speculum removed. If necessary, this procedure is repeated until all four quadrants have been injected.

Most patients have a slight burning sensation following injection. This may last from thirty minutes to one hour. Very rarely patients experience actual pain. Injections are repeated at weekly intervals until the main symptoms of bleeding and protrusion disappear. In most cases bleeding stops and protrusion does not recur after the first injection, the treatment, however, should be carried out for three or four weeks unless palpable fibrosis or slough results. In this case only the piles not indurated should be injected. The patient is ambulatory during the treatment.

**Injection Treatment.** Of the patients with internal hemorrhoids 77 per cent were advised to have injection and 18 per cent to have operation.

Two hundred and fifty-five of the patients received injection treatment for internal hemorrhoids. They received a total of 1119 injections. Some of the patients had only one injection, while others had more than twenty over a period of months. The average number per patient was four or five.

The number of injections into various quadrants is shown in Table 4. The left anterior quadrant

TABLE 4 *Quadrants Injected*

QUADRANT	NO. OF CASES
Right anterior	371
Right posterior	358
Left anterior	100
Left posterior	290
Total	1119

is much less frequently involved than the others. Our policy is to inject as many as three or four quadrants at the first visit, if necessary, and to repeat the treatment at intervals of one week. The hemorrhoids showing bleeding points or prolapsing are treated first.

Slough is the commonest complication of the injection treatment. It varies from a small area of mucous-membrane necrosis to complete destruction of the entire pile. Most of the sloughs in our cases consisted of small areas of necrosis unnoticed by the patient. They occurred twenty-four times in 1119 injections, an incidence of 2 per cent. Slough produces a sense of fullness and heat in the rectum, but very little pain unless it involves the epithelium of the anal canal, in which case pain is very severe. There is bloody discharge as the necrotic tissue liquefies, and healing gradually occurs in three to five weeks. Secondary hemorrhage is common but rarely serious. Ischiorectal abscess and fistula are spoken of as complications, but we have not encountered any in our cases. Pelvis phlebitis and pyemia are also described, but we have seen none. Furthermore, we have not observed either immediate or late untoward reactions from the injection of the quinine and urea hydrochloride solution.

**Surgical Treatment.** There were 36 patients in the series who had hemorrhoidectomy, and 24 others who refused operation. Very large prolapsing or bleeding internal hemorrhoids, especially if they are accompanied by external ones, should be removed by operation. These cases will not be discussed, nor will those of 15 patients who had small hemorrhoids requiring no treatment.

**Results.** Of the 255 patients who received injections for internal hemorrhoids 208, or 81 per cent, have been completely relieved of symptoms for varying periods up to two years. The remaining 47

dren below sixteen years of age whom they studied Rubinstein<sup>8</sup> also reported good results in stimulating hypoplastic genital development by the use of small doses of thyroid extract or, more effectively, by the use of either APL hormone or the anterior-pituitary sex hormone. This latter extract, of course, is substituting for the normal function of the anterior pituitary gland and is a way of stimulating the gonads to more active secretion. Evidence for this effect is found in the work of Sand and Plum,<sup>9</sup> who gave rather large doses of a Scandinavian preparation of APL hormone plus thyroid extract to children with dysmorphia adiposogenitalis (Fröhlich's syndrome). Two out of 3 of the boys showed distinct increase in the urinary excretion of testosterone, and this was associated with a distinct clinical improvement. In children it is natural that increases in sex-hormone excretion should occur spontaneously, but these changes followed treatment so promptly that it appears highly likely that the stimulation came from the injected APL hormone. This gives an excellent physiological explanation of the matur-ing effect of gonadotropic hormones.

Kunstadter<sup>10</sup> reports striking examples of premature puberty from the use of testosterone propionate (androsterone) in boys previously under-developed. The dose was only 5 mg, injected two or three times a week. This is obviously undesirable in children and indicates that the drug should not be used at this age. This is particularly true inasmuch as there is increasing evidence that its use inhibits the pituitary, which is such an important gland at puberty. Similar caution should be observed in the use of estrin preparations for infantile gonorrheal vaginitis, and this therapy should be temporarily discontinued if changes are noted in the breasts or genitalia.

The treatment of hypogonadism in the adult can be approached in two ways. The more desirable approach would be to stimulate the pituitary gland itself, thereby increasing its effect upon the gonads, but the technic for this is not as yet clear. A similar but sluggish effect can be obtained by potent anterior-pituitary gonadotropic hormones, but this technic has the disadvantage of somewhat inhibiting the patient's own pituitary gland. Synthetic testicular extract (testosterone) in injections up to 25 mg three times a week increases the size and normal function of the accessory sex organs in a striking manner but some times has a temporarily inhibiting influence on the gonads themselves. It also appears to lessen the gonadotropic secretion of the pituitary gland.<sup>11</sup> However, the use of testosterone propionate produces a striking effect upon the eunuchoid habitus

in the male so that with caution it can be used therapeutically with success. Kenyon<sup>12</sup> gave testosterone propionate to four male eunuchoids in doses up to 25 mg daily. The results were dramatic, with early increase in erections, enlargement of the penis and prostate, deepening of the voice, increase in sexual hair and marked increase in body weight. Vest and Howard<sup>13</sup> report the marked proportionate development of secondary sex organs, including the seminal vesicles and prostate, as well as the development of hair from the use of testosterone propionate. Their photographs demonstrate the striking changes they obtained. The amount of testosterone needed may be judged from the fact that from 7 to 21 mg of testosterone must be metabolized daily in the normal man. This is arrived at from the amounts found in the urine.

Testosterone propionate also relieves the distressing menopausal symptoms of female castrates by intramuscular injection of about 10 mg several times a week. Salmon,<sup>14</sup> Shorr and collaborators,<sup>15</sup> and more recently Birnberg, Kurzrok and Livingston<sup>16</sup> reported this and found the added advantage that it does not cause reactivation of the endometrium with its occasional return of menstrual bleeding.

Testosterone propionate has also been recommended in functional uterine bleeding. Inasmuch as it appears to suppress the ovarian function by depressing the anterior pituitary gland<sup>17</sup> it can be used to inhibit temporarily the menstrual cycle. Geist, Salmon and Gaines<sup>18</sup> report good results from this form of treatment in at least 18 of 25 cases. They used doses varying from 300 to 1000 mg of testosterone propionate per month for several months. Within a month after treatment was stopped, endometrial biopsies disclosed normal ovarian secretion. All these effects of testosterone on both men and women have been confirmed by Dr Nathanson in our laboratories.

The use of female sex hormones in the treatment of the menopausal syndrome has been well summarized recently by Hawkinson.<sup>19</sup> In 1000 consecutive patients, he obtained improvement in nearly 85 per cent. After about the eighth intramuscular injection of 10,000 international units of estrogen in oil or after two to three weeks of adequate oral treatment, many of the menopausal symptoms disappeared. It is to be expected that there would be a latent period before recovery.

Progesterone, the corpus-luteum hormone, has been used by Falls<sup>20</sup> and by Elden<sup>21</sup> in the treatment of habitual abortion. Falls has written a summarizing clinical paper, regarding the work of Falls, Krohn and Lackner, on the use of progesterone in obstetric complications. He speaks

is its dosage. This is obvious in the use of such extracts as are obtained from the thyroid gland, the parathyroid glands and the islands of Langerhans. Reliable objective and quantitative evidence can be obtained in regard to these by the determination of the basal metabolic rate, the blood calcium and the blood sugar, and so the dosage can be regulated. There is no such good objective evidence, however, to regulate the use of some of the other glandular preparations, and therapy must be controlled more empirically and, therefore, less efficiently, even though the preparation be effective.

The conclusion to be reached in regard to endocrine therapy seems obvious. The more effective the drug, the more we must know of its effects when used on human beings, and our physiological knowledge has certainly kept pace with our chemical improvements. The necessary knowledge is available, but the practical pharmacological application of these newly acquired facts cannot come so quickly. Let us remember that potent drugs can do harm as well as good, and let us be cautious in our use of these preparations.

It is also just as essential that the drug be indicated as that it be potent. Proper diagnoses are essential but in many cases difficult to make. If a menstrual disorder is dependent on a deficiency of corpus luteum, the giving of estrin will obviously not be therapeutically effective. The indiscriminate use of estrin, which is now common, proves little by its failures, for the crystalline preparations of this follicular hormone are potent if there is physiological need for them.

Up to the present, the least successful of purified hormones in clinical use has been the anterior pituitary hormone. The reasons for this are many. Its purification has been most difficult and depends not only on its animal source but also on the subsequent handling of the material,<sup>1</sup> for these extracts have not been brought to the high degree of purification which results in their crystallization or complete isolation. A second difficulty in regard to pituitary extracts is often the sluggishness of their action, for they have a far longer latent period than, for instance, has insulin. This is evident in the work of Nathanson<sup>2</sup> where it is demonstrated that the pituitary gland stimulates the production of sex hormones for many years before maturity occurs. It is obvious, therefore, that such stimulating drugs, even in large doses, will exert a slow therapeutic effect, for all the effects of the many anterior pituitary secretions seem to be the result of stimulating the other glands of internal secretion to proliferate and become active, and this secondary stimulation often appears slowly. A

third difficulty resulting from prolonged treatment with our present pituitary hormones (or with the anterior-pituitary-like [APL], sex stimulating hormone, which is probably made by the placenta) appears to be fatigue of the activated glands so that the stimulating effects wear off. Thus, an extract which needs prolonged use to produce changes, but which gradually loses its effectiveness, usually does not prove to be satisfactory. In spite of this, anterior pituitary extracts are giving evidence of some value in the treatment of growth retardation and in the stimulation of sex.

The treatment of undersized children by means of a potent growth hormone has been an outstanding need in medicine. For many years thyroid therapy has been used by the author because of the impression that it stimulated the pituitary gland. It appears to be mildly effective in stimulating growth, particularly in those children with a low basal metabolic rate and a marked retardation of "Bone-Age" development. There is also available a growth-promoting extract which is derived from the anterior pituitary gland. Such extracts, however, are very impure and are high in protein, and chemical purification has resulted in a low degree of potency, and it appears that several of the tropic pituitary hormones must be present in the extract in order to get the desired effect. Taylor<sup>3</sup> recently reported the effects of this therapy on 8 cases of retarded growth. In severe cases he obtained an increased increment of growth which indicated the value of the treatment. He used 2 cc of growth hormone three times a week (others have used larger doses). It must be emphasized that such growth hormone exerts its effects slowly and results should be judged over periods of many months or a year, not of weeks or days. Better results developed as the treatment continued, but startling rapidity of growth is not to be expected of this therapy at present.

The use of hormones for the treatment of undescended testicles in children has long been recommended. Recently, Thompson, Heckel, Thompson and Dickie<sup>4</sup> reported precocious puberty with marked hypertrophy of the genitalia from the use of large and prolonged doses of APL hormone. Hess and Kunstadter<sup>5</sup> did not observe such hypertrophy if they used more moderate doses, namely 100 to 200 rat units three times a week up to a total of 8000 units. Following the use of APL hormone for undescended testes in a seventeen-year-old boy, Powell<sup>6</sup> noted hypertrophy of the prostate, which apparently subsided after therapy was discontinued. Thompson, Heckel and Bevan<sup>7</sup> found with this preparation that testicular descent occurred in only about 33 per cent of the chil-



dren below sixteen years of age whom they studied Rubinstein<sup>8</sup> also reported good results in stimulating hypoplastic genital development by the use of small doses of thyroid extract or, more effectively, by the use of either APL hormone or the anterior-pituitary sex hormone. This latter extract, of course, is substituting for the normal function of the anterior pituitary gland and is a way of stimulating the gonads to more active secretion. Evidence for this effect is found in the work of Sand and Plum,<sup>9</sup> who gave rather large doses of a Scandinavian preparation of APL hormone plus thyroid extract to children with dysmorphia adiposogenitalis (Fröhlich's syndrome). Two out of 3 of the boys showed distinct increase in the urinary excretion of testosterone, and this was associated with a distinct clinical improvement. In children it is natural that increases in sex-hormone excretion should occur spontaneously, but these changes followed treatment so promptly that it appears highly likely that the stimulation came from the injected APL hormone. This gives an excellent physiological explanation of the maturational effect of gonadotropic hormones.

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enthusiastically about its use in threatened abortion. He has been using from 0.5 rabbit unit twice a week for prophylaxis up to 10 unit twice a day for patients with active symptoms. Elden's series of 6 successes in 8 cases is not sufficiently large to be convincing in a condition so prone to variations. However, the use of 10 to 45 international units of progesterone in his cases during the first six months of pregnancy is one with theoretical justification. Further data on this subject are needed.

Mortimer, Wright and Collip<sup>22</sup> have used estrogen (keto-hydroxyestrin or di-hydroxyestrin) in the treatment of atrophic rhinitis. The drug, dissolved in olive oil (100  $\mu$  gm per cc), is put in a nasal atomizer and about 0.25 cc is sprayed into each nostril at each application. Improvement is said to be obvious within a period of two to six weeks.

A good review of the pathologic physiology of the ovarian hormone has been written by Taylor,<sup>23</sup> in which the effects of the hormone on tissue growth are well summarized. This is a subject on which so much has been written recently that it seems wiser to refer those interested to Taylor's article rather than to review it here. The paper summarizes the more interesting, recent investigations concerning the therapeutic use of ovarian hormones. Such application is teaching us a great deal about their function and interrelations, and much is also being learned from the clinical syndromes which develop as a result of the over-functioning of the ovaries themselves.

The tumors which produce abnormalities of sex may originate in one of several glands of which the ovaries and adrenals are most frequently involved. Since many of these tumors actively secrete their specific hormones, they give their most obvious effects when occurring in childhood, for they then produce early sexual maturity which may appear even before the age of one year. That they are always due to an increase in the normal hormone cannot be stated with too much assurance, since Broster and Vines<sup>24</sup> described the isolation of a new androgen in a case of virilism. This compound was found in a case of bilateral adrenal hyperplasia, and less of it was found after the removal of one adrenal gland. This suggests that it originated in the adrenal gland. The adrenal gland is certainly closely related to sex. It is unlikely that this function is present in cortin, the substance so important to the case of Addisonian adrenal insufficiency. The portion of the adrenal cortex which is said to be related to sex is the submucous layer, the so-called fuchsinophil (be-

cause of its staining reaction) layer. This is, however, a controversial point.

Two very good summaries of the relation of the adrenal gland to sex have recently been written by Young<sup>25</sup> and by Reilly, Lissner and Hinman.<sup>26</sup> Young found that abnormalities could originate from malignant or adenomatous tumors or from a bilateral hyperplasia of the adrenal cortex. Surgical intervention, therefore, requires the visualization of both adrenals to look for bilateral hyperplasia but particularly to determine that the involved adrenal is not the only one present. In childhood, the effects of adrenal cortical overactivity result in sexual precocity. In boys it produces rapid growth and the development of adult sized genitalia and of corresponding secondary sex characteristics. It must be noted, however, that in the single case we have seen the testicles were not so large as was to be expected from the marked secondary sexual maturity.

In girls and women the effects are usually masculinizing and are made evident by a shift of body configuration, hair distribution and breast development toward the masculine appearance. Amenorrhea is not unusual. The voice becomes deep, and there is an enlargement of the larynx. The most striking change is the enlargement of the clitoris, which may become the size of a small penis. In children the ovaries remain immature, though 1 out of 3 of Young's<sup>25</sup> cases, a five-year-old child, excreted 1200 rat units of estrogenic hormone per liter of urine, which is an extremely large amount. The gland from which this hormone originated is not clear. It must, however, be remembered that adrenocortical tumors are not always masculinizing in their effects, for Lissner<sup>27</sup> has recently reported that, in men, cortical tumors may also produce gynecomastia and feminization. But the usual effect is masculinization.

A masculinizing tumor in women does not necessarily mean a tumor or hyperplasia of the adrenal cortex, for arrhenoblastomas of the ovaries will have a similar effect. Therefore, the differential diagnosis cannot be made from the general effects on the whole organism. Novak<sup>28</sup> has recently reviewed the literature on these ovarian tumors and has reported six new tumors which produced defeminization and masculinization phenomena. The striking masculinization effects again are hirsutism, deepening of the voice and hypertrophy of the clitoris, and with these usually go amenorrhea, regression of the mammary glands and loss of feminine contour. In 3 of his cases the tumors of the ovary proved to be primarily of adrenal tissue. Removal of the tumor is followed by a re-

turn toward normalcy. The manifestations of these tumors are no different from those of an adrenocortical tumor, so that every effort should be made to find which gland is overfunctioning, this frequently requires several operations. As one would expect, the masculinizing tumors of the ovary are less common than the feminizing tumors which arise in the same organ.

The sexual precocity which comes from a granulosa-cell tumor of the ovary is characterized by essentially normal sexual changes. When these changes appear at an early age, one then gets premature maturity. Inasmuch as this tumor secretes estrin, it produces adult female sex organs, with enlargement of the breasts and uterus and early menstruation. When it develops after the menopause, it produces a recurrence of uterine bleeding, endometrial hyperplasia and sometimes uterine polyps. The abnormal shift to masculine configuration that is seen in adrenal tumors or in arrhenoblastomas of the ovary is not found in patients with this lesion, for it is a feminizing tumor. It must also be recalled that similar general effects can be obtained through stimulation of the ovaries by an abnormally active anterior pituitary gland.

In this short report, the attempt has been made to summarize the recent advances in one phase of the endocrine field, namely the organs which influence sex development. This has been the field which has progressed most rapidly in the last few years because new active hormones have become available for therapeutic use and because new laboratory tests for studying the excretion of the hormones have been developed. Though much has been learned, it is to be expected that many further discoveries will develop.

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enthusiastically about its use in threatened abortion. He has been using from 0.5 rabbit unit twice a week for prophylaxis up to 1.0 unit twice a day for patients with active symptoms. Elden's series of 6 successes in 8 cases is not sufficiently large to be convincing in a condition so prone to variations. However, the use of 10 to 45 international units of progesterone in his cases during the first six months of pregnancy is one with theoretical justification. Further data on this subject are needed.

Marumet, Wright and Collip<sup>22</sup> have used estrogen (ketoandrosteron or dihydroxyestron) in the treatment of atrophic rhinitis. The drug dissolved in olive oil (100  $\mu$  gm. per cc.), is put in a nasal atomizer and about 0.25 cc. is sprayed into each nostril at each application. Improvement is said to be obvious within a period of two to six weeks.

A good review of the pathologic physiology of the ovarian hormone has been written by Taylor,<sup>23</sup> in which the effects of the hormone on tissue growth are well summarized. This is a subject on which so much has been written recently that it seems wiser to refer those interested to Taylor's article rather than to review it here. The paper summarizes the more interesting, recent investigations concerning the therapeutic use of ovarian hormones. Such application is teaching us a great deal about their function and interrelations, and much is also being learned from the clinical syndromes which develop as a result of the over-functioning of the ovaries themselves.

The tumors which produce abnormalities of sex may originate in one of several glands of which the ovaries and adrenals are most frequently involved. Since many of these tumors actively secrete their specific hormones, they give their most obvious effects when occurring in childhood, for they then produce early sexual maturity which may appear even before the age of one year. That they are always due to an increase in the normal hormone cannot be stated with too much assurance, since Broster and Vines<sup>24</sup> described the isolation of a new androgen in a case of virilism. This compound was found in a case of bilateral adrenal hyperplasia, and less of it was found after the removal of one adrenal gland. This suggests that it originated in the adrenal gland. The adrenal gland is certainly closely related to sex. It is unlikely that this function is present in *castra*, the substance so important to the case of Addisonian adrenal insufficiency. The portion of the adrenal cortex which is said to be related to sex is the subcapsular layer, the so-called foetalophyl (be-

cause of its staining reaction) layer. This is, however, a controversial point.

Two very good summaries of the relation of the adrenal gland to sex have recently been written by Young<sup>25</sup> and by Reilly, Lasser and Hinman.<sup>26</sup> Young found that abnormalities could originate from malignant or adenomatous tumors or from a bilateral hyperplasia of the adrenal cortex. Surgical intervention, therefore, requires the visualization of both adrenals to look for bilateral hyperplasia but particularly to determine that the involved adrenal is not the only one present. In childhood, the effects of adrenal cortical overactivity result in sexual precocity. In boys it produces rapid growth and the development of adult-sized genitalia and of corresponding secondary sex characteristics. It must be noted, however, that in the single case we have seen the testicles were not so large as was to be expected from the marked secondary sexual maturity.

In girls and women the effects are usually masculinizing and are made evident by a shift of body configuration, hair distribution and breast development toward the masculine appearance. Amenorrhea is not unusual. The voice becomes deep, and there is an enlargement of the larynx. The most striking change is the enlargement of the clitoris, which may become the size of a small penis. In children the ovaries remain immature, though 1 out of 3 of Young's<sup>25</sup> cases, a five-year-old child, excreted 1200 rat units of estrogenic hormone per liter of urine, which is an extremely large amount. The gland from which this hormone originated is not clear. It must, however, be remembered that adrenocortical tumors are not always masculinizing in their effects, for Lasser<sup>27</sup> has recently reported that, in men, cortical tumors may also produce gynecomastia and feminization. But the usual effect is masculinizing.

A masculinizing tumor in women does not necessarily mean a tumor or hyperplasia of the adrenal cortex, for arrhenoblastomas of the ovaries will have a similar effect. Therefore, the differential diagnosis cannot be made from the general effects on the whole organism. Novak<sup>28</sup> has recently reviewed the literature on these ovarian tumors and has reported six new tumors which produced defeminization and masculinization phenomena. The striking masculinization effects again are hirsutism, deepening of the voice and hypertrophy of the clitoris, and with these usually go amenorrhea, regression of the mammary glands and loss of feminine contour. In 3 of his cases the tumors of the ovary proved to be primarily of adrenal tissue. Removal of the tumor is followed by a re-

and did fairly until about one month before entry, when she again became nervous and weak and had general malaise.

Physical examination showed a well-developed and nourished woman in moderate distress from asthma. She was excited, crying and weak. The face showed a dozen scattered reddish papules. The legs were swollen, and there were many papulopustular lesions over the legs and ankles. There were musical rales in the chest. Examination of the heart was negative. The blood pressure was 150 systolic, 90 diastolic. The reflexes were normal, but the hands showed slight tremor.

The temperature was 97.6°F, the pulse 95, and the respirations 23.

The urine showed a trace of albumin, and the sediment contained 5 white cells, with a rare small clump, per high-power field. A phenolsulfonephthalein kidney-function test showed no impairment. The blood showed a red-cell count of 4,200,000 with 75 per cent hemoglobin, and a white-cell count of 10,100 with 56 per cent polymorphonuclears, 3 per cent large lymphocytes, 24 per cent small lymphocytes, 4 per cent mononuclears and 13 per cent eosinophils. A blood Hinton test was negative. The nonprotein nitrogen of the serum was 19 mg per 100 cc. The sedimentation rate was 22 mm in fifteen minutes, 48 mm in thirty minutes, 54 mm in forty-five minutes, 58 mm in sixty minutes. Two blood cultures were negative. Sputum examinations showed no acid-fast bacilli. A urine culture showed non-hemolytic streptococci.

X-ray films of the chest showed a marked change in the heart shadow since the last examination. The heart was diffusely enlarged. The pulsations were rapid and weak. The lung fields remained the same.

On the fifth hospital day the patient had a severe asthmatic attack which was relieved promptly by 4 gr of aminophyllin intravenously. On the twelfth hospital day a portable chest film was taken which showed the heart shadow to be apparently somewhat smaller than previously. The lung fields were less radiant. Two days later an electrocardiogram showed a regular rate of 120. The P-R interval was 0.16 sec.  $T_1$  and  $T_4$  were low,  $T_2$  and  $T_3$  inverted. An x-ray film of the chest on the twenty-sixth hospital day showed a small amount of fluid at the left base. On the thirty-sixth hospital day there was bronchial breathing in the left base. Since entry her chart had been essentially normal except for a rapid pulse rate varying between 90 and 140. A blood examination on the thirty-sixth day showed a red-cell count of 4,200,000 and a white-cell count of 15,000 with 43 per cent polymorphonuclears, 1

per cent large lymphocytes, 2 per cent small lymphocytes, 1 per cent mononuclears, 43 per cent eosinophils and 1 per cent basophils. Physical examination at this time revealed red skin lesions on each cheek and it was noted that she had had similar lesions on her nose. There were also alternate pale and heavily pigmented areas on the forehead. No heart murmurs were heard, and there was no pericardial friction rub. The heart beat was regular at 150, with gallop rhythm heard at the apex and lower left border of the sternum.

On the thirty-eighth hospital day a pleural friction rub was heard over a wide area to the right of the sternum, extending to the right anterior axillary line. Moist crackling rales were heard toward each side and in each axilla. The following day there was dullness over both bases, extending to the angles of the scapulae. The patient was very weak and stated that she was going to die. The pulse remained at 160. The respirations increased to 35. Another blood count showed 17,700 white cells with 47 per cent polymorphonuclears, 1 per cent large lymphocytes, 13 per cent small lymphocytes, 7 per cent mononuclears and 32 per cent eosinophils. She rapidly failed, and died on the forty-second hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. J. H. MEANS. This is a long and complicated story dividing itself into several chapters which may or may not be importantly related. I think it may simplify matters if I pick one item as a sort of text for my talk, namely the eosinophilia, which is very impressive. An eosinophilia of these proportions is not a particularly common laboratory finding, but there are so many counts here that we can assume that this finding is correct and that we are truly dealing with marked eosinophilia, at first with a normal total white count and later moderate leukocytosis. Furthermore, this eosinophilia became progressively greater as time went on.

There are only a few diseases in these parts that will produce an eosinophilia of this degree. One is, of course, trichinosis and one is, perhaps, asthma, which she had, so we are told, and the third, periarteritis nodosa. Eosinophilia occurs in asthma, but yesterday, without asking anything else about the case,—I did not request help but information stated in an abstract way,—I asked Dr. Rackemann how high an eosinophilia one can get in uncomplicated asthma. He did not like the term 'uncomplicated asthma,' and he did not want to state a figure, and he can contradict me now it I am interpreting him incorrectly, but I got the impression that he thought it unsafe to attribute an eosinophilia as high as 40 per cent to uncom-

# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25141

### PRESENTATION OF CASE

*First Admission* A thirty-seven-year-old single, female, Hebrew bookkeeper was admitted with a diagnosis of left renal colic.

Three years prior to admission she had had two attacks of pain, the first in the left abdomen, the second in the left back. X-ray films and intravenous pyelograms were negative. She knew of no hematuria at that time. Nine months before entry she had had a cholecystectomy for chronic cholecystitis. The uterus was also removed because of a "growth." Following this she had a right pyelitis. Pus, blood and bacteria were found in the urine. In spite of treatment she continued having malaise and abdominal pain, not localized to any one point. "Indigestion" had remained the same as it was previous to her gall-bladder operation. A few weeks before entry an x-ray diagnosis of left-sided kidney stone was made at an outside hospital. During the previous two weeks she had had a chronic upper respiratory infection. Her tonsils had been removed and her sinuses drained in childhood. Ten years before entry an appendectomy was done. Her catamenia had been regular and normal up to the time of hysterectomy.

Physical examination definitely showed more tenderness in the right costovertebral angle than in the left. The remainder of the physical examination was essentially negative. The blood pressure was 135 systolic, 80 diastolic. The urine examination was negative except for the presence in the sediment of 2 white cells and numerous bacteria per high-power field. The blood showed a red-cell count of 4,670,000 with 80 per cent hemoglobin, and a white-cell count of 11,900 with 70 per cent polymorphonuclears, 1 per cent large lymphocytes, 19 per cent small lymphocytes, 6 per cent mononuclears and 4 per cent eosinophils, the platelets were slightly increased.

On the fifth hospital day a left ureteral calculus was removed, and she was discharged on the twenty-second hospital day.

*Second Admission* (twenty-one months later) One year and a half before re-entry she developed asthmatic symptoms, and six months later began to have marked blocking of the nose, sneezing and

watery discharge. Physical examination revealed edematous polypoid tissue in the region of the middle meatus on each side of the nose. X-ray films showed distinct cloudiness of both antrums. Examination of the urine was negative. The blood showed a red-cell count of 3,900,000 with 65 per cent hemoglobin, and a white-cell count of 15,100 with 57 per cent polymorphonuclears, 22 per cent small lymphocytes, 3 per cent mononuclears and 17 per cent eosinophils. On the second hospital day a bilateral radical antrum operation, including bilateral ethmoidectomy and sphenoidectomy, was done. Her chart remained essentially normal. She was discharged on the fifteenth hospital day.

*Third Admission* (two months later) Following her antrum operation the patient noticed no improvement. The nose remained obstructed and she breathed through the mouth. There was swelling of the face over the antrums, and swelling of the lower lid on the left and upper lid on the right, which caused some interference with vision. Her symptoms had increased during the previous three weeks. About one month before admission she was ill with pain in the right lower chest, which was aggravated by deep breathing. She also suffered from generalized body aches, especially in the knees and shoulders. She did not have fever. Physical examination showed markedly infected sinuses with what proved to be a pure culture of *Staphylococcus aureus*. She had diplopia which increased in looking down to the right. There was paresis of the right superior oblique muscle. The visual fields were normal. The remainder of the physical examination was negative. The blood pressure was 120 systolic, 80 diastolic. The temperature was 100°F, the pulse 90, and the respirations 16. Examination of the urine was negative. The blood showed a red cell count of 4,640,000 with 80 per cent hemoglobin, and a white-cell count of 19,800 with 53 per cent polymorphonuclears, 1 per cent large lymphocytes, 15 per cent small lymphocytes, 6 per cent mononuclears, 24 per cent eosinophils and 1 per cent basophils. The serum protein was 6.8 gm per 100 cc. X-ray films of the chest showed thickening of the apical pleura on both sides. The lung fields were otherwise clear. The diaphragm was low in position but moved well with respiration on both sides. The heart shadow was not remarkable. The patient was discharged on the fifth hospital day.

*Final Admission* (seven months later) Two months before her final admission she was told that she had an "upset thyroid" at an outside hospital, where she remained for three weeks. The basal metabolism rate fell from +40 to +16 per cent. Following this she returned to work

them, I can assume they cleared up. I can think of one thing that could produce this picture, namely an iodine rash. On this admission the asthma became worse, and another interesting feature is that her heart rapidly became larger. The cardiographic evidence shows no interference with the conduction system but does show evidence of some myocardial disease, with a rapid, weak pulse, with a rapidly enlarging heart which later became smaller and with gallop rhythm. All this indicates to me that she had very extensive and grave myocardial disease at that time. She may also have had a pericardial effusion, there are no data that permit me to state that definitely, but the fact that the heart got larger and then smaller makes one wonder if she had accumulated some fluid and then reabsorbed a portion of it. I cannot go farther with that, it is just a possibility. She had evidence of a process in both pleurae, with fluid on the left. There was some kind of parenchymatous disease in the lungs, whether it was pneumonia or infarct or something else, I am not capable of saying with the information at hand. Then she became rapidly sicker and died, not of asthma apparently, according to the story, but with a steadily mounting white count and relatively high eosinophilia.

I state that this patient had periarthritis nodosa because I do not see how, with the data provided, one can make any other diagnosis. If one can, I shall learn a great deal. I think that disease was the chief cause of her death. I know that the disease kills almost invariably in short order, but I gather that the course may be longer than the textbooks state it to be, which is only a few months. I believe that she also had asthma, and I should suggest, although this is largely Dr Rackemann's idea, that there is some association between asthma and periarthritis nodosa.

Another thought that occurs to me is that, since she had a queer skin lesion on her face and had involvement of many serous surfaces and her heart, she may have had lupus erythematosus disseminatus. I recall that Dr Soma Weiss standing on this very spot, or near it, a year or two ago made a diagnosis of lupus erythematosus disseminatus and Dr Mallory made a diagnosis, on the same patient, of periarthritis nodosa. That would suggest that there is a relation between periarthritis nodosa and lupus erythematosus disseminatus. They are both diseases which involve blood vessels, periarthritis involving middle-sized arteries supplying muscles, and lupus involving much smaller arteries near the surface and giving serous involvement. Either may have myocardial and renal complications. I wonder if they may not be the same disease. Perhaps in one case the involve-

ment is chiefly of somewhat larger arteries and in another of smaller arteries or sometimes of both. I am going to throw in lupus as a good possibility, and assume that the lupus, if she had it, and the periarthritis, which I am sure she had, either jointly or singly involved the myocardium extensively. My diagnosis reads periarthritis nodosa, asthma, and possibly lupus erythematosus disseminatus. She had a low-grade infection of the urinary tract, perhaps with some stones remaining. She had a chronic pansinusitis. I do not believe she had a brain abscess. The heart, as I see it, was parenchymatously involved. There was no valve lesion, no endocarditis. She may have had pericarditis. She had bilateral pleurisy, old and new, with effusion on the left. She had something going on in the lungs, whether it was pneumonia or infarct or consolidation that was directly due to the periarthritis nodosa, I do not know.

DR FRANCIS M RACKEMANN. There is a tremendous difference between looking at the patient on the one hand and reading this account on the other. I marvel at the way Dr Means can throw away the irrelevant parts of this history and bring out the other parts which are so important. Meantime the history is hardly fair, because there were one or two things that would have helped Dr Means considerably. When this woman came to the hospital for the last admission, skin lesions were apparent on her face but they did not amount to much. They were small reddish papules with some superficial scaling, diffusely scattered on both sides of the forehead and with one or two over the malar eminences. There was nothing remarkable about them,—no butterfly appearance,—and in my mind they passed off as an iodine rash. She had the same thing on the ankles, but there were only a very few lesions, and they were, on the whole, unimportant. Last night in going over my record more carefully I recalled another skin lesion not thought of at the time and not mentioned here. Over the inner malleolus on the left side there was a round, swollen, purplish area about 5 cm in diameter, which I presume was an early lesion of periarthritis. Also not mentioned in the history was the fact that she had had one hemoptysis, which seemed to us of some importance.

On the second hospital day of the last admission a pleurisy developed. The friction rub was perfectly obvious. The pleurisy came rather early in the disease, and it continued throughout her stay, with evidence of increasing fluid in both chests. On account of this pleurisy, this serositis, most of the doctors who saw her thought first of lupus erythematosus, with periarthritis as a secondary consideration. From the clinical point of view

plicated asthma I do not believe she had trichinosis.

Now we can proceed. Let us take up admission by admission and see what we can make out of each. It is obvious on the first one that she had urinary lithiasis. They took out a stone and found that she had infection of the urinary tract. The stone came from the left and the tenderness was more marked on the right, so we are entitled to believe she had bilateral infection, at least of the pelves of the kidneys. We take note of the fact that this woman had been simplified by the removal of various organs. The gall bladder had been taken out, this did not relieve the symptoms, so I assume she did not have gall-bladder disease that was causing symptoms. Why they took out the uterus we are not told. It is to be noted also that she had in the past had her appendix removed. Lastly she had this operation in which they took out the calculus, after which she was discharged, this permits us to assume that she was relieved of the immediate difficulty.

Twenty-one months later we learn that she developed asthma or something that resembled it and led to that diagnosis. We also learn she had a troublesome rhinitis with polyps, also infection of the antrums. I suspect that she had infection of all her accessory sinuses with polyps. We know that asthma is very frequently associated with nasal polyps and sinus infection so that it is not surprising to find these conditions associated here, and one might suspect that the nasal infection and sinus infection had something to do with the asthma. I think it is perfectly reasonable to suppose she suffered from intrinsic asthma that had to do with this chronic upper respiratory infection. It is interesting to know that at that time her eosinophilia began, and it might well have been due to asthma. Then she had a radical sinus operation which apparently did her no good. I suspect it did her harm, but I cannot prove it.

On the third admission she had a suppurative pansinusitis. In addition, there was a picture of acute pleurisy at the right base, with thickening of both pleurae at the apices, according to the x-ray film, so at this time we have evidence of acute and chronic pleural disease involving both sides. Then she had this interesting swelling of the eyelids, also some swelling over the antrums. I suspect these may have been due to the sinus infection, although I cannot prove it. She may have had angioneurotic edema for all I know. But in trying to put things together I believe that this swelling in some way had something to do with the widespread suppurative affair in the sinuses, many of which had been denuded of the mucous membrane

surgically. We learn later that she was thought to have had some disease of the thyroid, and of course one gets puffiness of the eyelids in Graves's disease, but I cannot reconcile this description with the puffiness seen in exophthalmic goiter. One also gets puffiness of the eyes in trichinosis, which also has increased eosinophilia, but that does not seem to fit the picture in this case. I think the swelling probably had to do with the local infection. She also had a palsy of the left superior oblique muscle, causing diplopia. By consulting a textbook of anatomy, I discovered that that muscle is innervated by the fourth cranial nerve and that nerve runs along in close proximity to the orbit on its mesial surface, so it is not far away from the infected sinuses. Of course with all her sinus infection she might have had a brain abscess, and that might have affected this one nerve. I believe if it was in the posterior fossa it could do so. I looked up also in a textbook of neurology the causes of palsy of the fourth nerve. It made no mention of peripheral factors. I also waylaid Dr. Ayer in the corridor and said, "Do not help me any but answer this question, Can sinusitis give a palsy of the fourth nerve?" He thought awhile and said that he had never seen it but that it probably could. So I am going to cling to that explanation because I do not believe she had a brain abscess. I do not believe so because we do not hear any more about it and she lived for some time without developing any other neurological symptoms. Furthermore, I am going to blame the sinus infection for the swelling of the eyelids. I am interested that she had a normal heart at this time and that the eosinophilia was greater than that on the previous entry.

On the next entry we hear that she had an "upset thyroid." One cannot possibly make a diagnosis of thyroid disease on the information we have. I shall say that if she did have toxic goiter, —and she may have had it,—it is interesting to note that the basal metabolic rate came down from +40 to +16 per cent. It might do that from natural causes or because someone gave iodine. Whether someone did, we do not know, but at any rate she got better.

On her final admission the only things that suggest thyrotoxicosis are a slight tremor and a tachycardia. At this time she had a remarkable series of significant lesions. Her legs were described as swollen, and there were many pustular lesions over the legs and ankles, on her face there were scattered reddish papules. I should really like to know how they were scattered, whether they were symmetrically arranged in butterfly patterns, but we are not told. I do not know what these lesions were, as no further mention is made of



them, I can assume they cleared up. I can think of one thing that could produce this picture, namely an iodine rash. On this admission the asthma became worse, and another interesting feature is that her heart rapidly became larger. The cardiographic evidence shows no interference with the conduction system but does show evidence of some myocardial disease, with a rapid, weak pulse, with a rapidly enlarging heart which later became smaller and with gallop rhythm. All this indicates to me that she had very extensive and grave myocardial disease at that time. She may also have had a pericardial effusion, there are no data that permit me to state that definitely, but the fact that the heart got larger and then smaller makes one wonder if she had accumulated some fluid and then reabsorbed a portion of it. I cannot go farther with that, it is just a possibility. She had evidence of a process in both pleurae, with fluid on the left. There was some kind of parenchymatous disease in the lungs, whether it was pneumonia or infarct or something else, I am not capable of saying with the information at hand. Then she became rapidly sicker and died, not of asthma apparently, according to the story, but with a steadily mounting white count and relatively high eosinophilia.

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the striking feature was the sudden change which came over this rather healthy, bright and cheerful woman who came to the hospital in fair condition. She had chronic vasomotor rhinitis, chronic sinus disease and some asthma. Then she proceeded to go downhill. Fortunately there had been an x-ray film taken not so long before the admission, and when the new x-ray film was taken, the change in the heart size was seen to be extraordinary.

If I may have a moment, I should like to say that in going over a series of 900 patients with asthma I find 32 cases in which a story of chronic vasomotor rhinitis had preceded the asthma by two or three years. These patients evidently developed the rhinitis first and then had asthma of severe type beginning suddenly in the midst of chronic vasomotor rhinitis. All of them had sinus disease at the time. That is a very small group, only 32 out of about 900, but 10 of them have died, so that this disease which begins with a vasomotor rhinitis and goes on to asthma of a severe type is evidently a serious one. It should be said, however, that at least 3 of the group are now cured, being free of symptoms and signs at the present time. The symptom complex does not necessarily imply a fatal outcome. I believe, as Dr. Means suggested, that the sinus disease is in no way a cause of the trouble but that the sinus disease and the asthma together are part of a symptom complex which we can call "intrinsic asthma." The nature of it we know nothing about.

#### CLINICAL DIAGNOSIS

Periarteritis nodosa

#### DR. MEANS'S DIAGNOSES

Periarteritis nodosa (chief cause of death)  
Bronchial asthma  
Lupus erythematosus disseminatus?  
Diffuse myocarditis  
Pericarditis with effusion?  
Old and new pleurisy, with effusion on left  
Parenchymatous lung lesion, type uncertain  
Suppurative pansinusitis  
Chronic urinary tract infection

#### ANATOMICAL DIAGNOSES

Periarteritis nodosa  
Pericarditis with effusion  
Chronic degenerative myocarditis, focal  
Hydrothorax, bilateral  
Pulmonary atelectasis, bilateral  
Dermatitis, papulo-pustular (? iodine rash)  
Operative scars: appendectomy, cholecystectomy, ureterotomy

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: The autopsy of this patient showed a pericarditis with a considerable accumulation of turbid, almost purulent, fluid and bilateral pleural effusions with relatively clear fluid. The heart itself was a little but not strikingly enlarged. When it was cut, obvious spots of gross discoloration in the myocardium enabled one to make grossly a diagnosis of myocardial degeneration. There was no endocarditis. The lungs were rather diffusely collapsed. There were no signs of asthma, but there were one or two small foci of consolidation. The kidneys were a little large, about 400 gm., but there was no evidence of any persisting infection in the renal pelvis or elsewhere in the urinary tract. On microscopical examination, arteries were found in various organs, particularly in the myocardium, which were sufficiently characteristic to enable one to make a definite diagnosis of periarteritis nodosa. There was also an extensive nephritis of a focal glomerular type. We did not happen to catch any arterial lesions in the kidney. The liver showed a very severe central necrosis. One pulmonary artery showed a lesion which was very suggestive of periarteritis nodosa. This is the first time I have seen a lesion in a pulmonary artery, though we have seen them in the bronchial arteries. From the anatomical point of view there is no possible question of the diagnosis. Dr. Means's suggestion that she had lupus erythematosus disseminatus is a safe one because I cannot rule it out on an anatomical basis. However, I cannot restrain myself from expressing a clinical opinion and saying that I do not believe she had it.

DR. RACKEMANN: Did her kidneys show wire loop lesions?

DR. MALLORY: No, but only 1 of 16 cases of lupus erythematosus that we have carefully studied has shown that lesion.

DR. MEANS: Was anything wrong with the thyroid gland?

DR. MALLORY: No.

DR. MEANS: Was the brain examined?

DR. MALLORY: Yes, grossly. There certainly was no abscess.

#### CASE 25142

#### PRESENTATION OF CASE

A thirty-eight-year-old white married woman was admitted complaining of diarrhea.

Since the age of six years the patient had more or less regularly had diarrhea with six to eight movements in twenty-four hours, occasionally at night. Blood-streaking was present at the onset

Two years of regulated life in a boarding school gave her one or two normal bowel movements a day and she was distinctly better during her first year and a half in college. Nineteen years prior to admission the diarrhea became very much worse and was associated with a considerable amount of bleeding. At the age of twenty-five years an acutely inflamed appendix was removed. At operation it was noted that the terminal 45 cm. of the ileum was thickened and surrounded by slightly enlarged lymph nodes, the sigmoid and cecum were considerably thickened, the transverse colon only slightly. In the same year she was treated for fistula and fissure in ano. The diarrhea continued with six to eight movements a day.

Because of profuse painful catamenia a bilateral oöphorectomy was done when she was thirty-one years of age. The pathological diagnosis was endometriosis. The ileum was found to be very much dilated and thickened, and the cecum had contracted to the size of the ileum. The colon everywhere was much thickened and narrowed. She stated that prior to this operation her menses had always increased the bowel activity and discomfort.

During the next seven years her condition remained essentially unchanged. Numerous stool examinations for parasites were negative. Her weight remained at about 130 pounds. From time to time the anal sphincter was dilated.

Physical examination showed a well-developed and nourished woman who appeared much older than her stated age. The skin was drawn tight, wrinkled and dry. There was no abnormal pigmentation. The nails were brittle. The thyroid gland was not palpable, and there was no tremor. Examination of the chest was negative. The blood pressure was 120 systolic, 80 diastolic. The abdomen was soft. There was a definite, rounded, tender mass in the right upper quadrant in relation to the distal portion of the proximal half of the transverse colon. It seemed to move down slightly with respiration. By rectal examination the mucocutaneous region was pale and slightly thickened. The anal ring was narrowed, inelastic and roughened. Five centimeters above the sphincter there was a second narrowing, more contracted than the first, and introduction of the fingertip caused slight discomfort to the patient.

The temperature was 99.5°F, the pulse 80, and the respirations 18.

Examination of the urine was negative. The blood showed a red-cell count of 5,240,000 with 85 per cent hemoglobin, and a white-cell count of 19,300 with 80 per cent polymorphonuclears, 17 per cent lymphocytes and 3 per cent eosinophils.

The platelets were normal. The nonprotein nitrogen of the serum was 17 mg. per 100 cc. A stool examination was guaiac positive.

A gastrointestinal x-ray series was negative. A barium enema showed the entire colon to be abnormal. The rectum did not dilate to the usual size, and the walls of the sigmoid and descending colon were more or less rigid with irregular wavy outlines. There was definite obstruction to the flow of barium at about the middle of the transverse colon. After considerable delay, small amounts passed through this portion of the transverse colon, between the midline and the hepatic flexure was a constriction with a ragged, mottled outline. No normal mucosa could be demonstrated in this area. The patient evacuated the enema satisfactorily, and there did not appear to be any definite obstruction to the flow of intestinal contents in the normal direction. After six weeks, during which time the patient complained of some soreness in the region of the mass, the barium enema was repeated. It met a complete obstruction at the midportion of the transverse colon, and only a trace of barium passed beyond this point to the hepatic flexure. The lumen of this portion was reduced to a very narrow channel and the mucosa was completely destroyed. The distal margins of a mass in the wall of the bowel were demonstrated. The mucosa throughout the distal colon was also destroyed, the haustral markings being absent. The cecum and ascending colon could be examined only from six-hour barium-meal films, both showed acute ulceration. Nine days later an ileostomy was done. Four months later another abdominal operation was performed.

#### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES: I can only point out some of the things that have been stated in the notes. This is the point of obstruction at the time of the last observation. This is the posterior portion of the bowel, which is dilated. It has a peculiar mucosal pattern in the first portion, but it is apparently not very rigid. In the early examination this point beyond the stricture is also abnormal so far as the mucosa is concerned.

DR. HORATIO ROGERS: How about the mass demonstrated as a tumor in the wall of the bowel?

DR. HOLMES: There is an area here close to the stricture. But it does not look like a tumor mass in this film. I do not believe there was a tumor.

DR. ROGERS: How much change took place between the first examination and the second, six weeks later, with regard to that area?

DR. HOLMES: A change from partial obstruction to complete obstruction, whether it is organic,

I am not certain It could be due to spasm the second time An ulcerated area which was active one time and not the next might do it I do not believe we have enough evidence to say that there is a new growth which has increased in size, but I think from Dr Lingley's report that that is what he had in mind This film certainly does look very much like a tumor mass This lobulated effect looks decidedly like tumor A little later I should say that same area does not look that way at all

#### DIFFERENTIAL DIAGNOSIS

DR ROGERS We can summarize this case as one of diarrhea and bleeding of thirty-two years' duration, with remissions and exacerbations Sixteen years after the onset a surgeon operated on her and found a picture consistent with regional ileitis I do not see how we can prove that she did not have regional ileitis at that time There are cases that have spontaneously subsided The fistula in ano and the fissure have no significance to me in the way of helping to explain this picture, or the picture which she had nineteen years after onset The fistulas of regional ileitis are perhaps suggested but not strongly enough to help Twenty-five years after onset she was operated on again and endometriosis was found, plus changes in the intestines which could not be caused by endometriosis Endometriosis can involve certain parts of the intestine, chiefly the small intestine, but not the whole colon The statement is made that the whole colon was abnormal Thirty-two years after onset she had a tumor and we are not told what brought her to the hospital, presumably an exacerbation of the same symptoms that she had been having On admission she had a stricture of the rectum, a gross deformity of the entire colon and an abdominal mass, presumably of the hepatic flexure or near it She was well developed and nourished, which is a little surprising in view of the long story of diarrhea and bleeding Her red count was over 5,000,000 which is not so surprising when we take into account the other evidences of dehydration, the dry brittle nails, parched skin, and so forth, as described

The extent of the x-ray changes in the colon rule out many of the causes of prolonged diarrhea, such as hyperthyroidism, allergy, emotional instability, achylia gastrica and the chronic bacillary dysenteries The whole colon is abnormal by x-ray There is a normal x-ray picture of the small intestine and of the stomach and duodenum, a finding which to me completely rules out regional ileitis Regional ileitis usually starts at the ileocecal valve, and always involves the small bowel, it occasionally affects the cecum and rarely patchy por-

tions of the colon, but never the entire colon with out any involvement of the small intestine This leaves four conditions to be considered Lympho granuloma inguinale can be mentioned only to be dismissed It is a common cause of rectal stricture but does not invade the whole colon Tuberculous colitis is usually a terminal complication of advanced pulmonary tuberculosis It seems conceivable that it would have caused such extensive damage in the colon in a patient with a normal chest plate Amebic dysentery may be very difficult to rule out It could be as chronic as this The failure to find amebae in the stools means but little The rectal mucosa should have shown certain characteristics, for example multiple ulcerations, with no gross deformity such as this one had She might have had more of an eosinophilia, she had 3 per cent but that is not conclusive If this diagnosis had been suspected it is probable that a course of emetine would have been tried Nothing is said about it That does not rule it out, however

I finally came to chronic idiopathic ulcerative colitis in its milder form It may be as chronic as this It is characterized by exacerbations and remissions Its greatest incidence is in young people It involves the whole colon in 93 per cent of cases, according to Rankin The rectum is almost always involved It could explain this case except for the mass in the upper abdomen Is that mass inflammatory, obstructive or neoplastic? I have tried to make Dr Holmes commit himself a little on that point, but he would not A point against neoplasm is that the second film, taken six weeks after this one in which a mass in the bowel wall is suggested, shows no evidence of tumor However, 3 per cent of patients with ulcerative colitis develop superimposed cancer, according to Bagen If it is not neoplastic it must be either inflammatory or obstructive The whole mass may have been simple distention of the bowel behind partial obstruction, which later became complete through progressive scarring, or there may have been active inflammation in the wall of the bowel at that point I cannot tell The tenderness over it is perhaps a little more suggestive of inflammatory swelling of the colon at that point My diagnosis is chronic idiopathic ulcerative colitis with possibly superimposed carcinoma at the hepatic flexure

DR. TRACY B MALLORY Are there any suggestions?

DR AUGUSTUS S ROSE I should like to ask Dr Jones or Dr McKittrick how often ulcerative colitis begins at the age of six?

DR CHESTER M JONES It is not uncommon to have it begin in children I am sure we have

seen them as young as five years of age at this hospital, and they have reported a much younger group from the Children's Hospital, Dr Urmv tells me that the disease has been described in children as young as six months. Certainly it has been reported in early childhood, if not infancy.

DR. LELAND S. MCKITTRICK: This woman represents the longest standing condition of this type that I have ever happened to see. I saw her first when she was a patient of Dr. Daniel F. Jones years ago. I saw her in that acute episode and helped him take out her appendix. The description, given here, very accurately fits the condition at that time. She later developed stricture of the rectum, which Dr. Jones used to dilate gently. Following Dr. Jones's death she came to me and later this mass in her upper abdomen was found. She was sent into the hospital for more careful investigation. Dr. Chester Jones saw her at that time. The thing which disturbed us was the fact that following the ileostomy this mass in the upper abdomen did not get smaller. It seemed to us fair to expect that, if the lesion was wholly inflammatory, draining the bowel completely through an ileostomy ought to have had a beneficial effect on the mass. A subtotal colectomy was then done. There was a large mass in relation to the first portion of the transverse colon. I could not tell whether this mass represented malignant disease. There was a small abscess in the mesentery of the bowel in that region, from which *Bacillus coli* was grown.

DR. CHESTER M. JONES: Other points might be added in view of what Dr. Rogers said. It is probably fair to state that the mass was there all the time. I agree with Dr. McKittrick that this case is unusual in that this patient had had diarrhea since the age of six but nevertheless carried out a perfectly normal life in surprising fashion. While she was described as well developed and nourished I think that is not quite right because she did have, as Dr. Rogers pointed out, very marked evidence of dehydration. It was more than dehydration; it was malnutrition. If I remember correctly she had tongue changes, evidently a certain degree of deficiency disease existed as the result of many years of malnutrition.

DR. JOHN D. STEWART: How often in a case of ulcerative colitis for twenty-five years would it be possible to dilate the sigmoid to the degree we see in the films?

DR. JONES: Ordinarily it would be a rubber-hose type and of smaller caliber than normal.

A PHYSICIAN: How is she now?

DR. MCKITTRICK: She has not been a joy in every sense of the word. I think she is going to

leave the hospital tomorrow, after a very prolonged stay.

#### CLINICAL DIAGNOSES

Chronic ulcerative colitis  
Carcinoma of the transverse colon?

#### DR. ROGERS'S DIAGNOSIS

Chronic ulcerative colitis, possibly with superimposed cancer of transverse colon

#### ANATOMICAL DIAGNOSES

Chronic ulcerative colitis  
Polyposis coli  
Adenocarcinoma, Grade II, with metastasis to regional node

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: The specimen which was removed showed a typical extensive ulcerative colitis with many narrow linear ulcerations. A dozen soft polyps were scattered at irregular intervals. In the transverse colon was a frank ulcerative carcinoma, 6 cm. in length, that had extended through all layers of the bowel wall. There was a metastasis to one of the regional nodes. It was, however, a very exceptionally well-differentiated adenocarcinoma of a low grade of malignancy, therefore I think the outlook is not too hopeless.

DR. MCKITTRICK: She represents the second case, so far as I know, that we have had in the group here of carcinoma which would seem clearly to be associated with long-standing ulcerative colitis. There was a girl of twenty-two who had had an ileostomy at approximately the age of ten. She subsequently developed a massive carcinoma of the colon.

DR. MALLORY: Perhaps it is only a question of time before carcinoma develops in such a case. We do not see many cases that extend over thirty years.

DR. JONES: I should like to bring up one other point about the typical operative finding in terminal ileitis. I think there are probably more cases with involvement of the ileum than we recognize. This curious condition we call ileitis does not always warrant surgery. In many instances conservative medical treatment is definitely indicated.

DR. MALLORY: It is naturally very difficult or impossible to distinguish at some stages between ulcerative colitis and regional ileitis because it is perfectly possible, especially in children, for ulcerative colitis to pass the ileocecal valve and extend up the ileum, and also for regional ileitis to involve at least a portion of the colon.

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## HARVEY CUSHING AT SEVENTY

ON April 8, 1939, Harvey Cushing will be seventy years of age. His friends from America and from distant lands will meet in New Haven, under the auspices of a group of neurologists and neurosurgeons, many of them pupils of his, the Harvey Cushing Society. To them and other guests will fall the honor of personal greetings. But the world at large will also be thinking of this great figure in American medicine, perhaps the foremost physician produced by the United States. Without being unmindful of the preceding figures in American medical history, may we not, on this occasion, honor the acknowledged leader of modern medicine? What manner of man, however, do we congratulate on his threescore years and ten?

The writings proclaim the man! His scientific contributions run from the report of his first researches (1900-1901) in the Inselspital and Hal-

lerianum at Berne under the guidance of Kocher, a physician for whom he always had the greatest admiration, to his latest and perhaps greatest work, the monograph, with Dr. Louise Eisenhardt, entitled *Meningiomas* (1938). The paper inspired by Kocher was on the subject of intracranial pressure, and the young physician, taking Kocher's advice "to see all round his subject," made a thorough investigation. A spark of interest in intracranial surgery was touched off, to grow and shine with such brilliancy for thirty-eight years that one may well say a new field of surgical treatment was disclosed and thoroughly explored by Harvey Cushing.

The first monographic report, the result of researches at the Johns Hopkins Hospital and the Hunterian Laboratory, was *The Pituitary Body and its Disorders* (1912), now a classic in medicine and a rare bibliophilic item. At the Peter Bent Brigham Hospital in Boston, monographs followed in an astoundingly regular order: *Tumors of the Nervus Acusticus and the Syndrome of the Cerebellopontile Angle* (1917), with an edition in French, published in 1924; *A Classification of the Tumors of the Glioma Group on a Histogenetic Basis with a Correlated Study of Prognosis* (1926), written with Dr. Percival Bailey, with an edition in German, published at Jena in 1930; *Studies in Intracranial Physiology and Surgery* (1926), *Tumors Arising from the Blood-Vessels of the Brain* (1928), written with Dr. Bailey; *Papers Relating to the Pituitary Body, Hypothalamus and Parasympathetic Nervous System* (1932), *Intracranial Tumours* (1932), with an edition in German, published in 1935, and one in French, in 1937, and finally, *Meningiomas: Their classification, regional behaviour, life history and surgical end results* (1938). All these works represent correlated and integrated studies, for the last volume reports cases going back to the Johns Hopkins period, and each patient is followed to date or to the termination of the individual's life. There is a distinctive style in all these books: a broad approach, documented and illustrated case histories, special and general conclusions. Although each may be used separately, together they form a picture of neuro-

surgical practice as carried on in the leading clinic of its kind in the world Truly Harvey Cushing, as only a few men have ever done, has looked "all round his subject," has profited by his mistakes of previous years and has kept the spirit of the studious investigator throughout his life

One must not, however, base judgment on a series of monographs, important as they are Innumerable scientific papers also appeared during his active life, some of the material never finding its way into the more durable monograph form An example may be given in the series of papers issued during the War, which had such a marked effect in cutting down the mortality from penetrating wounds of the brain, first in the British army and later in the American forces Under war conditions few clinical papers came fresh from the front line, "A Study of a Series of Wounds Involving the Brain and its Enveloping Structures" in the *British Journal of Surgery* (1918) was exactly that and to find a duplicate in detail illustrations and final importance would be nearly impossible Other outstanding papers were 'The Chiasmal Syndrome', papers on the posterior pituitary hormone and the parasympathetic nervous system, reports concerning trigeminal neuralgia, and, finally, his account of pituitary basophilism, now known as Cushing's syndrome The list is long, but the few noted above show the trend of the lot, each in itself of importance for an occasion and many of them permanently valuable in the history of medicine To these, moreover, should be added his contributions to the systems of surgery and medicine "Surgery of the Head" in Keen's (1908), 'Intracranial Tumors in Osler's, 1910, revised as each edition subsequently came out Important at the time, how many general surgeons and practitioners may have been helped by the solid, sane advice therein!

On the literary side, books and papers are also abundant One easily recalls the charming prefatory note to the *Dedication Exercises of the Oscar C Tugo Circle* (1921), *The Life of Sir William Osler* (1925), *An Account of the Dedicatory Ceremonies in Connection with the Base Hospital No 5 Memorial* (1928), the collected essays, *Consecratio*

*Medici and Other Papers* (1928), *The Medical Career The ideals, opportunities and difficulties of the medical profession* (1929), *The Personality of a Hospital* (1921), and the stirring *From a Surgeon's Journal* (1936) Among the papers, one reads most often "Realignments in Greater Medicine Their effect upon surgery and the influence of surgery upon them" (1913), "The Physician and the Surgeon" (1922), "Neurological Surgeons With the report of one case" (1923), "The Western Reserve and its Medical Traditions" (1924), 'The Doctor and His Books' (1927), "The Binding Influence of a Library on a Subdividing Profession" (1930), "Medicine at the Cross-Roads" (1933), and "The Pioneer Medical Schools of Central New York" (1934) No one should overlook, however, the scholarly and provocative "Report of the Surgeon-in-Chief," published in the annual reports of the Peter Bent Brigham Hospital from 1913 to 1931—those for 1916, 1917 and 1918 are by other hands Here he "let go" in a manner not possible under other circumstances, and one reads his inner thoughts on medical education, full-time professors, hospital management and similar topics Along formal lines these are perhaps his most important educational contributions to posterity At least, if you wish to know the man, they must be read and slowly digested, as a picture of "our time" in medicine they are invaluable

When we look at all these works, what manner of man do we see? Harvey Cushing has flown higher and sustained his flight more consistently than any of his medical contemporaries One never thinks of him as "grounded" That steady pull throughout the years in the clinic, here or abroad, is always evident, perhaps gracefully somewhat relaxed since his retirement from active neurosurgery a few years ago And yet, books, both scientific and literary, pour forth even now, for "relaxation" does not mean quite the same to this man of genius as it does to the Saturday afternoon golfer or the evening bridge player Like the Russian whose watch stopped in 1917 and to whom "all time is now tea time," to Cushing all time is work time, and because this is so today and has been

so for the last four decades, the world is richer and medicine has made a major advance

Hardly a day but that reverberations  
Of your name will ring out like a clear bell  
In times and lands now unpredictable  
Here and over unborn foreign nations,

Speaking of the brain and of its surgery,  
Workers will say 'Cushing said and Cushing did —  
Thus and so when all this was more hid  
Than now, our present, his futurity —'

Courage and genius, energy and will,  
These were little enough for you to spill  
Into the vortex that the chaos was,

Attacking the nervous system and its laws  
Unknown to many till you made them known  
Past barriers of muscle, meninx, bone!\*

\*Moore M M New York Harcourt, Brace and Company 1938 P 902

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### POSTPARTUM HEMORRHAGE LACERATION OF THE CERVIX

Mrs E. C., a thirty-five-year-old gravida V, was admitted to the hospital on November 29, 1915, at term in mild labor and with some vaginal hemorrhage.

The family history was negative, as was the patient's past history. She had never had any serious illness or operation. Catamenia began at fourteen, were regular with a twenty-eight-day cycle, and lasted four days without pain. Her last menstrual period was February 21, 1915, making the expected date of confinement November 29. Three of her previous pregnancies had resulted in normal, full-term deliveries, and the fourth had terminated with a miscarriage at the third month. Her present pregnancy had been normal until labor started, following which she had noticed persistent, profuse bloody show.

Physical examination disclosed a healthy appearing patient in mild labor. The heart was not enlarged, and the sounds were regular and of good quality, there were no murmurs. The blood pressure was 124 systolic, 76 diastolic. The lungs were

resonant, and there were no rales. Uterine contractions were coming at ten-minute intervals and lasted thirty seconds. The baby presented by the vertex in an OLA position. Rectal examination revealed the cervix to be dilated to admit one finger. There was some dark blood oozing from the vagina. The fetal heart rate was 156 and was best heard in the left lower-abdominal quadrant.

In view of the persistent hemorrhage, preparations were made for a vaginal examination. Under ether anesthesia the patient was found to have a soft cervix, which was partly taken up and dilated to two fingerbreadths. No placental tissue was felt in the lower uterine segment. A diagnosis of premature separation of a normally implanted placenta was made, and immediate delivery was considered advisable. Accordingly, the cervix was manually dilated. A forceps was then applied to the baby's head, which was found to be above the pelvic brim. The head was delivered by intermittent downward traction. The baby was in good condition.

Following the delivery of the baby there was a brisk hemorrhage. The placenta was therefore manually extracted. The hemorrhage continued, although the placenta and membranes seemed to be intact. The uterine cavity was then tightly packed with gauze. Examination of the cervix revealed a bilateral laceration, which extended out into the vault on the right side but apparently did not involve the broad ligament. Several chromic catgut sutures were inserted, and the hemorrhage subsided. The vagina was then packed tightly with gauze and treatment was immediately instituted to combat shock. The patient's pulse was 140, weak and irregular. Ergot, posterior pituitary extract, morphine and strychnine were administered. The pulse rate rapidly dropped to 112.

Twelve hours after delivery the gauze packs were removed from the vagina and uterus. There was no recurrence of hemorrhage. An intrauterine douche was then given. The patient had a temperature which ranged up to 101°F for six days but otherwise had an uneventful convalescence. She was discharged on the thirteenth postpartum day with the lacerations well healed, the uterus fairly well involuted, and the vaults free.

*Comment* This case is one more example of what not to do, and although the outcome was not so tragic as it might well have been, it is the picture that so often followed manual dilatation of the cervix. There is no mention in the history of the pulse rate before delivery. The blood pressure of 124 systolic, 76 diastolic, leads one to infer that the amount of blood lost had been quite im-

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.



material. The presence of the fetal heart beat and the normal feel of the uterus showed that if any separation of the placenta existed it was only partial. In 1915 the great majority of cases that bled at the beginning of or before labor were inferred to be placenta previas, now we know that in comparison to separations of the placenta, previas are very rare. The softness of this uterus and the presence of the fetal heart beat probably led the attendant to believe that a previa of some type was the cause of the bleeding.

Before such a case is examined, the patient should be matched for possible transfusion, and the operating room prepared to meet that which the examination reveals. If examinations of cases with placenta previa are bungled and a bagging kit and a cesarean outfit are not in readiness, too much bleeding may result before proper operation can be undertaken. This column has so frequently condemned the complete manual dilatation of the undilated cervix that it is hardly necessary to state again that the operation has no place in obstetrics. Of course, this case should have been either left alone, bagged or treated by artificial rupture of the membranes. The brisk hemorrhage which immediately followed the birth of the baby, before placental separation, should have led to the diagnosis of a lacerated cervix. The placenta should not have been immediately extracted. This in itself is a serious obstetric performance. Examination of the cervix would have revealed the laceration extending into the vault on the right. This could have been properly sutured, and the placenta left until it had normally separated. In this way the uterus would not have been invaded by the hand, it would not have been packed, and the subsequent infection would probably never have occurred.

In 1915, intrauterine douches after the removal of an intrauterine pack were still commonly used. Today such douches are almost never employed. One has but to review the era of accouchement force and contrast it with modern-day conservatism to appreciate that operative obstetrics has not only not stood still but has made marked improvement.

#### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 10.

##### BARNSTABLE

Sunday, April 16, at 4 00 p. m., at the Cape Cod Hospital, Hyannis. Subject—Anemia. Modern methods in diagnosis and treatment of blood

dyscrasias. Instructor: William P. Murphy. Donald E. Higgins, *Chairman*.

##### BERKSHIRE

Thursday, April 13, at 4 30 p. m., at the House of Mercy Hospital, Pittsfield. Subject—Heart Disease. The treatment of heart attacks or cardiovascular emergencies. Instructor: R. Earle Glendy. Melvin H. Walker, Jr., *Chairman*.

##### FRANKLIN

Wednesday, April 12, at 8 00 p. m., at the Franklin County Public Hospital, Greenfield. Subject—Syphilis. Latent syphilis—diagnosis and treatment. Instructor: Francis M. Thurmon. Halbert G. Stetson, *Chairman*.

##### HAMPDEN

Thursday, April 13, at 4 00 p. m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p. m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—Bleeding in the Third Trimester of Pregnancy. Instructor: Robert L. DeNormandie. George L. Schadt, *Chairman*.

##### MIDDLESEX SOUTH

Tuesday, April 11, at 4 30 p. m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Subject—Operative Obstetrics. Instructor: Judson A. Smith. Alexander A. Levi, *Chairman*.

##### SUFFOLK

Thursday, April 13, at 4 30 p. m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. Subject—Control and Treatment of Respiratory Infections. Instructor: Charles F. McKhann. Reginald Fitz, *Chairman*.

#### LEGISLATIVE NOTES

##### PROPOSED REVISION OF HOUSE BILL 1407

##### AN ACT TO PREVENT ALIENS FROM PRACTICING MEDICINE

*Section 1.* The Board of Registration in Medicine shall not examine any candidate who is an alien unless he presents to them a certificate of the Naturalization Bureau of the United States that he has declared his intention of becoming a citizen of the United States. Any alien physician already registered must, within one year, present to the Board a similar certificate. The Board must suspend the registration of any physician who fails to comply with this provision, the suspension to remain until the requirement is fulfilled. Five years following the registration of those registered after the presentation of their certificates and five years following the presentation of the certificate of those registered previously, the physician must present to the Board his completed naturalization papers. The license of any physician who fails to comply with this provision must be revoked by the Board.

*Section 2.* The provisions of this act shall not apply to licenses of medical students as student assistants or in terns or to the limited license of interns to practice within a hospital.

CHARLES C. LUND, *Chairman*

##### DEATH

DANE—JOHN DANE, M.D., of 33 Woodland Road, Jamaica Plain, died March 27. He was in his seventy-fourth year.

Born in Brookline, he prepared for college at Noble's School. He graduated from Harvard University and received his degree from Harvard Medical School in 1892. After serving his internship at the Massachusetts General Hospital, he became connected with the Marcella Street Home, the Boston Infants Hospital and the Boston Children's Hospital and was an assistant to the late Dr. Robert W. Lovett. He made numerous trips abroad, visiting nearly all the hospitals in England, France, Germany and Italy where orthopedic surgery was a specialty. For several years he was an instructor in orthopedics at the Harvard Medical School.

Dr. Dane was a member of the Massachusetts Medical Society and the American Medical Association.

His widow and a son survive him.

## MISCELLANY

### A RESOLUTION

The following resolution was adopted by the Massachusetts Public Health Association on January 26

WHEREAS, it has been unequivocally established that milk properly pasteurized is freed from the living bacteria responsible for tuberculosis, typhoid fever, diphtheria, scarlet fever, septic sore throat, undulant fever and other microbial diseases that may be transmitted through milk, and that the public health is more effectively safeguarded by the adoption of pasteurization for community milk supplies, and

WHEREAS, many communities in Massachusetts as well as in other states have adopted local ordinances requiring that all milk other than certified milk sold within their legal areas be pasteurized prior to being offered for sale, and

WHEREAS, Dr. Willys M. Monroe, health officer of Pittsfield, Massachusetts, in his desire to provide justifiable public-health protection to the people of that city caused an ordinance to be adopted requiring that all milk other than certified milk be properly pasteurized before being offered for sale within the city limits, and

WHEREAS, this effort to achieve recognized public health protection met with strong opposition in the city, thus necessitating carrying the case to the Supreme Judicial Court of Massachusetts, which court upheld the proposed ordinance as a reasonable requirement today for adequate public-health protection, therefore, be it

RESOLVED, that the Massachusetts Public Health Association recognizes this latest professional achievement of Dr. Monroe and commends him for his courageous and valiant effort on behalf of the public health of Pittsfield and the Commonwealth of Massachusetts and be it further

RESOLVED, that the Massachusetts Public Health Association recognizes that Dr. Monroe's efforts in this regard meet with the accepted professional requirements for adequate public health protection today, and be it further

RESOLVED, that a copy of this resolution be sent to Dr. Monroe, the Mayor of Pittsfield, Massachusetts, the *New England Journal of Medicine* and the daily press

## CORRESPONDENCE

### HISTORY OF THE IRON LUNG AND OTHER FACTS

*To the Editor* The original iron lung, or the "spiropore," was first produced in 1876 by Woillez and described by him at a meeting of the Académie de Médecine (Paris) on June 20, 1876. He reported four experiences in a paper entitled, *Du spiropore, appareil de sauvetage pour le traitement de l'asphyxie, et principalement de l'asphyxie des noyés et des nouveau-nés* (*Bull Acad de med Paris* 41 611-625, 1876). He had made reference to such treatment of asphyxia in an earlier report (*Bull Acad de med Paris* 40 441-455, 1875). This iron lung was strikingly similar in appearance and identical in principle with Drinker's or Emerson's "iron lung." It consisted essentially of a steel cylinder enclosing the body of the patient, a rubber collar around the neck providing an airtight seal. Photographs of this original "iron lung," or spiropore, showing the instrument opened and closed with a patient in it, appear in the *Bulletin de l'Académie de médecine Paris* (119 82-85, 1938) and in the *Lancet* (1 237, 1939), the latter being contained in a letter by Dr. C. L. G. Pratt.

It is interesting to note that Lord Nuffield, of England, has offered to donate 500 iron lungs—one to each of the large hospitals in the British Isles, where there will be properly qualified and trained persons to supervise the use of these special machines. They will cost only about 25 or 30 pounds (less than \$150) each!

The original iron lung idea belongs to Woillez, and credit for the invention should rightfully go to him!

The Bragg-Paul Pulsator is a pneumatic jacket for applying rhythmic positive pressure, and is a very convenient and effective apparatus. The Drinker and Both machines and the Emerson modification are total enclosure instruments, the entire body, with the exception of the head, being enclosed in the apparatus. The Bragg-Paul apparatus is much preferred by some English experts to the Drinker-Emerson type. The Burstall apparatus applies negative pressure and resembles a cuirass. The Biomotor is a German apparatus. There is also an apparatus recently introduced in Sweden.

It is highly essential that, regardless of type of respirator used, especially trained persons must supervise its use. If a respirator is handled unskillfully, the patient may die! Careful teamwork is at all times necessary in these emergency cases where respirators are used.

HYMAN I. GOLDSTEIN, M.D.

1425 Broadway,  
Camden, New Jersey

### CASE 25801 AN ADDENDUM

Some of the obscurity in this interesting 'Case Record' (*New Eng J Med* 220 347-351, 1939) can be cleared up by the insertion of an additional diagnosis made when I first saw this patient December 17, 1938, the day after his admission to the hospital, but unfortunately omitted from the record as presented at the clinicopathological conference. His chief complaints on admission were vomiting, weakness and dehydration. He gave in addition, of course, the old story of heart disease, and undoubtedly there was some heart failure involved.

The chief cause of his acute illness on admission to the hospital I believed to be a *toxic effect of digitalis*. We estimated that he had had 89 cat units of the drug in fifty-three days. This amount was later corrected (overcor-

rected, I believe) by his physician to a somewhat lower figure, but was probably not very far from the actual dose given. Even the lower figure was above the saturation point. Thus, there was a considerable excess of digitalis, and since he was an elderly man, this effect would be more pronounced than in a younger person. There was also further evidence of the toxic effect of the digitalis in the form of marked tachycardia prior to admission, which required quinidine for control.

This important point about digitalis intoxication was not brought out in the printed record and could not of course be shown at autopsy, yet it was undoubtedly a very significant factor in the case. The toxic effect was further borne out by his improvement in the hospital after stopping the drug and following the introduction of fluids to combat the dehydration, in the absence of much evidence of congestive heart failure. Also very important as evidence was the partial heart block (P-R interval of 0.25 second) at entrance which subsided after five days (0.18-0.20 second), when he felt much better.

PAUL D WHITE M.D

Massachusetts General Hospital,  
Boston

## PNEUMONIA AND THE HEALTH OF THE NATION

*To the Editor* Your effective editorial 'Pneumonia and the Health of the Nation, March 2, 1939, calls attention to the fact that There was an excess in the [incidence] rates among families who were not on relief but whose incomes were less than \$125 per month.

The significance of this fact is well demonstrated, I believe, in a recent study of mine (A Study of the Economics of Pneumonia *United States Public Health Reports* 53 2153-2168, 1938), where the average cost of pneumonia, \$167, found in a sample of cases in New York City was contrasted with the monthly income of \$125 of half of the families in New York City. To quote from the study: It is obvious that a disease, the average cost of which when hospitalized is more than a family's monthly income, can rarely be paid for out of current family earnings.

Even when there is home instead of hospital treatment, the loss of income, if a wage-earner is affected, may put the total burden on the family up to a point which approaches the cost of a hospitalized case.

In addition to the conclusions drawn in the editorial, it becomes apparent that increased subsidization and further extension of pneumonia-control programs, based upon sound medical principles, are needed. This will remain substantially true, despite the fact that the economics of control programs may change radically with the increased use of sulfanilamide and its derivatives.

JOSEPH HIRSH, *Research Associate*

Committee on Research in Medical Economics  
9 Rockefeller Plaza,  
New York City

## REPORT OF MEETING

### TUFTS MEDICAL ALUMNI MEETING

Nearly three hundred alumni attended the annual alumni dinner of the Tufts College Medical School Association at the Hotel Somerset, Wednesday evening March 29. Speakers were Dr Alonzo K. Paine, president of the association; Mr Harold E. Sweet, president of the Trustees of Tufts College; Dean A. Warren Stearns of

the medical school; Dr Samuel H. Proger, medical director of the Joseph H. Pratt Diagnostic Hospital; and President Leonard Carmichael, of Tufts College, who delivered the main address of the evening. Dr Frederick W. O'Brien, professor of radiology, presided.

## NOTICES

### REMOVALS

JOSEPH TARTAKOFF, M.D., announces the removal of his office from 371 to 370 Commonwealth Avenue, Boston. Telephone KENmore 5480.

BENJAMIN RISEMAN, M.D., announces the removal of his office from 371 to 370 Commonwealth Avenue, Boston. Telephone KENmore 5480.

MAURICE S. SEGAL, M.D., announces the removal of his office from 371 to 370 Commonwealth Avenue, Boston. Telephone KENmore 5480.

### BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, April 12, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D., *Secretary*  
Medical Staff

### SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, April 18, at 12 o'clock noon. Dr Joseph C. Aub will speak on Recent Advances in the Study of Internal Secretions.

Physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary*

### CUTTER LECTURE

Dr Frederick F. Russell, professor of preventive medicine and epidemiology emeritus of Harvard University, will give the annual Cutter Lecture in Preventive Medicine at the Harvard Medical School on Monday, April 17, at 5:00 p.m. Dr Russell's subject is The History of Yellow Fever as an Illustration of Methods of Study and Control of Virus Diseases. The Cutter Lectures have been given each year since 1912. The medical profession, medical and public health students and others interested are invited to attend.

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, April 11, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 8:15 p.m.

#### PROGRAM

Presentation of cases

Etiology and Pathogenesis of Thyrotoxicosis. With special reference to its pituitary origin. Dr A. W. Elmer, of Lwow, Poland.

Medical students and physicians are cordially invited to attend.

ROBERT M. ZOLLINGER, M.D., *Secretary*

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DAVID B. STEARNS, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING  
MONDAY, APRIL 10

## TUESDAY APRIL 11

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Physical Examination of Groups Dr R. W. Buck
- \*10 a m 12 30 p m. Tumor clinic Boston Dispensary
- 12 30 p m. Hospital Council. Palmer Memorial New England Deaconess Hospital
- \*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital (Shattuck Street entrance)

## WEDNESDAY APRIL 12

- \*9-10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- 12 m Boston City Hospital Monthly clinicopathological conference Pathological amphitheater
- \*12 m Clinicopathological conference. Children's Hospital amphitheater
- 8 15 p m Greater Boston Medical Society Beth Israel Hospital auditorium.

## THURSDAY APRIL 13

- 8 30-9 30 a m Exchange visit, Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Children's Hospital Surgical
- \*9-10 a m Joseph H Pratt Diagnostic Hospital Metrazol Therapy in Dementia Praecox. Dr Arthur Berk.
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY APRIL 14

- 9-10 a m Joseph H Pratt Diagnostic Hospital Here and There in Endocrinology Dr Fuller Albright
- 10 a m Department of Mental Health Research Symposium Metropolitan State Hospital Waltham
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Clinical meeting of the Children's Medical Service. Massachusetts General Hospital Ether Dome.

## SATURDAY APRIL 15

- \*9-10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation. Dr S J Thannhauser
- 10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

Open to the medical profession

APRIL 4-29—Joseph H Pratt Diagnostic Hospital Medical Conference Program Page 581 issue of March 30

APRIL 9—Health Lecture, Quincy City Hospital Page 636 issue of February 23

APRIL 11—Harvard Medical Society Page 613

APRIL 11—Hospital Council Page 580 issue of March 30

APRIL 12—Greater Boston Medical Society Page 614

APRIL 12—Boston City Hospital Monthly clinicopathological conference Page 613

APRIL 13—Pentucket Association of Physicians 8 30 p m. Hotel Bartlett 95 Main Street Haverhill.

APRIL 13—Medical clinic at the Peter Bent Brigham Hospital Page 614

APRIL 14—Department of Mental Health Research Symposium Page 614

APRIL 17—Cutter Lecture. Page 613

APRIL 18—South End Medical Club Page 613

APRIL 21 and 22—New England Health Education Institute. Page 614

MAY 3-6—American Association of Mental Defect. Page 614

MAY 7-15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 12 and 13—American Heart Association Page 542 issue of March 23

MAY 13-16—American Board of Obstetrics and Gynecology Page 457 issue of March 9

MAY 14-20—American Physicians Art Association Page 404 issue of March 2.

MAY 15-19—American Medical Association St. Louis, Missouri

MAY 22 23 and 24—American Association for the Study of Gonorrhea Page 405 issue of March 2

JUNE 5 6 7 and 8—American Association of Industrial Physicians and Surgeons. Page 581 issue of March 30

JUNE 6 7 and 8—Massachusetts Medical Society Worcester

JUNE 12-17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19

JUNE 26-29—National Tuberculosis Association. Page 936 issue of December 8

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11-15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3—New York Academy of Medicine Page 581 issue of March 30

FALL, 1939—Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

MAY 10—Annual meeting Salem Country Club Peabody

## SUFFOLK

APRIL 26—Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced

## WORCESTER

APRIL 12—Page 542 issue of March 23

MAY 10—Worcester Country Club—annual meeting

## BOOKS RECEIVED FOR REVIEW

*The Genetics of Schizophrenia A study of heredity and reproduction in the families of 1,087 schizophrenics* Franz J Kallmann. 291 pp New York J J Augustin, Publisher, 1938 \$5.00

*The Control of the Circulation of the Blood* R. J. S. McDowall, with the assistance of G. E. Malcomson and I. McWhan 619 pp London, New York and Toronto Longmans, Green & Co., 1938 \$22.50

*The Vaginal Diaphragm Its fitting and use in contraceptive technique* Le Mon Clark. 107 pp St. Louis The C. V. Mosby Co., 1939 \$2.00

*Transactions of the American Association of Genito-Urinary Surgeons* Fiftieth Annual Meeting held at Absecon, New Jersey, May 2, 3 and 4, 1938 Vol 31 405 pp St. Paul and Minneapolis The Bruce Publishing Co., 1938

*Clinical Gastroenterology* Horace W. Soper 314 pp St. Louis The C. V. Mosby Co., 1939 \$6.00

*Studies from the Rockefeller Institute for Medical Research* Vol 110 567 pp New York The Rockefeller Institute for Medical Research, 1939 \$2.00

*Gonorrhea in the Male and Female A book for practitioners* P. S. Pelouze. Third edition, thoroughly revised 489 pp Philadelphia and London W. B. Saunders Co., 1939 \$6.00

*Clinical Biochemistry* Abraham Cantarow and Max Trumper Second edition, revised. 666 pp Philadelphia and London W. B. Saunders Co., 1939 \$6.00

*The Newer Knowledge of Nutrition* E. V. McCollum, Elsa Orent Keiles and Harry G. Day Fifth edition, entirely rewritten 701 pp New York The Macmillan Co., 1939 \$4.50

## BOOK REVIEWS

*Modern Surgical Technique* Max Thorek. 2045 pp Complete in 3 vol Philadelphia, London, Montreal and New York J. B. Lippincott Co., 1938 \$33.00

In this three volume work the author describes the technique of operations in every department of surgery, including ophthalmology. It is profusely illustrated with very good drawings, many by Shepard, and photographs which reflect the author's well-known ability in that field. Unfortunately, like many similar books, discrimination is lacking in the presentation of many operations. For example, the rarely performed Lisfranc's and Syme's amputations receive as much space as the common mid thigh amputations. Also, in the section on plastic surgery, considerable attention is paid to the generally abandoned procedures of heterografting and zoografting, with direc

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# The New England Journal of Medicine

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VOLUME 220

APRIL 13, 1939

NUMBER 15

## BRONCHOSCOPIC DILATATION OF BRONCHIAL STENOSIS FOLLOWING THORACOPLASTY FOR TUBERCULOSIS\*

EDWARD B. BENEDICT, M.D. †

BOSTON

RELATIVELY little has been written about bronchoscopy in tuberculosis, though it is generally recognized that bronchoscopy is indicated in bronchial obstruction, whether due to tuberculosis or other pathologic lesions. Jackson<sup>1</sup> mentions complete bronchial occlusion by cheesy pus and debris from a tuberculous peribronchial node that had eroded through the bronchus. Clerf<sup>2</sup> believes that bronchoscopy is indicated in tuberculosis when unexplained symptoms such as wheezing or dyspnea occur. In cases where tuberculosis was unsuspected he established a positive diagnosis of pulmonary tuberculosis by bronchoscopy. Eloesser<sup>3</sup> has found bronchial stenosis to be frequently due to various tuberculous processes, and has made many bronchoscopic examinations in tuberculosis without ill effect. Myerson<sup>4</sup> reports a series of 60 cases of pulmonary tuberculosis where bronchoscopy was performed, and says that "in not a single instance was there an exacerbation of the disease or a spread to a new area of the lung following bronchoscopy." Ballou<sup>5</sup> has performed bronchoscopy because of the development of asthmatic symptoms in known cases of pulmonary tuberculosis; improvement has resulted from dilatation of stenosis and removal of granulation tissue. Samson<sup>6</sup> in a recent discussion of tuberculous tracheobronchitis states: "Bronchoscopically four types of lesions are distinguishable, two or more of which may co-exist in the same patient." These four types are the non-ulcerative and non-stenotic, the hyperplastic, the ulcerative and the stenotic.

With regard to the pathogenesis of tuberculous stenosis of the bronchus following thoracoplasty, it seems probable that some degree of tuberculous tracheobronchitis exists before thoracoplasty is undertaken, and that the collapse of the lung, with possible kinking and compression of the bronchi, results in an approximation of the bronchial sur-

faces, local spread of the tuberculous process, ulceration and stenosis. Samson<sup>6</sup> and his co-workers believe that the ulcerative type of tracheobronchial tuberculosis is more active and virulent than the non-ulcerative, and state that "because of the obviously poor prognosis we do not now recommend any type of collapse therapy for patients with ulcerative tracheobronchial lesions unless subsequent bronchoscopic examinations demonstrate a tendency for the ulcers to heal without the formation of an important stenosis." They believe that collapse therapy is not a responsible etiologic agent. It seems to me that we must postulate a pre-existing tracheobronchial tuberculosis which may well have been activated by the collapse procedure. The importance of bronchoscopy before collapse therapy is undertaken is therefore self-evident in any case where there is a suspicion of tracheobronchial tuberculosis.

Three cases of bronchial stenosis following thoracoplasty for tuberculosis, reported below, have recently come under my care for bronchoscopic examination and treatment. Unfortunately none of the patients had had a preoperative diagnostic bronchoscopy, because the thoracoplasties were performed before the importance of this preliminary procedure had become recognized.

### CASE REPORTS

*Case 1.* E. H. (U No 85643), a 40-year-old, married, American housewife, entered the Massachusetts General Hospital for bronchoscopy on October 22, 1936. She gave an 8-year history of pulmonary tuberculosis involving the entire right upper lobe, treated at Rutland State Sanatorium and Mattapan Sanatorium with pneumothorax. A right phrenicectomy was done in 1933. First, second and third stage thoracoplasties were done in 1934, following which the patient was discharged home on bed rest, but had intermittent episodes of fever, cough and raising of sputum. On October 4, 1935, x-ray examination of the chest with Lipiodol showed normal filling of the left bronchial tree. The right main bronchus showed a cone-shaped stenosis (Fig 1) starting about 1 cm. beyond the bifurcation. From October, 1935, to October, 1936, the

\*From the Massachusetts General Hospital, Boston.

†Assistant in surgery, Harvard Medical School; assistant surgeon, Massachusetts General Hospital.

tions for the transplantation of skin from the greyhound, chicken and frog to human beings. This section, like many others in the book, is studded with unfamiliar names, but with relatively few references to the literature for the curious student. On the other hand, no mention is made of such common and much discussed procedures as the injection treatment of hernia or the internal fixation of fractures of the neck of the femur.

Electrosurgery is vigorously championed throughout, particularly in the chapter on surgery of the liver and gall bladder where the author's operation, cholecysto-electrocoagulectomy, is well described. Certain statements are difficult to explain, for example, on page 1609 it is stated: "Exploration of the biliary passages should be omitted in the presence of jaundice."

The book should be useful for the surgeon called on to perform an operation with which he is unfamiliar, but it is not recommended for the beginner or occasional operator.

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*The Surgical Treatment of Hypertension* George Crile.  
239 pp Philadelphia and London W B Saunders  
Co., 1938 \$4.00

In his most recent book Dr Crile carries on further with a theme which has interested him for many years. This was first presented in an Ether Day Address at the Massachusetts General Hospital in 1910 entitled "Phylogenetic Association in Relation to Certain Medical Problems." In 1934, his writings and thoughts on this general subject were gathered together in a volume *Diseases Peculiar to Civilized Man*. His latest work is a fitting sequel to this, it presents a theory concerning the etiology of essential hypertension and discusses the early results of celiac ganglionectomy.

Regarding the rationale of this procedure, his theory appears to be a colorful restatement of the neurogenic theory of the origin of essential hypertension. This has been discussed in detail by Fishberg, and is well known by those interested in this disease. Whether hypertension is actually of neurogenic origin or whether it is the result of primary changes in the peripheral vascular bed is still unknown.

The actual performance of the operation may be described as somewhat of a sleight-of-hand performance. While the technic may be feasible in Dr Crile's hands, it does not appear to be one which should be recommended to others. It would appear that adequate surgical exposure of the celiac ganglia for the purpose of their removal could be obtained in a more satisfactory manner than that used by Dr Crile.

Although the operation is different from most of those previously advocated, its object is really quite similar. All other procedures aim to denervate the splanchnic bed but in general do not necessitate removal of the celiac ganglia. Experience has shown that the best results of sympathectomy are obtained by resection of the preganglionic portion of the motor pathway, rather than by resecting the postganglionic pathway or removing the ganglia in which the synapses lie. Thus celiac ganglionectomy is a postganglionic rather than a preganglionic section. All other procedures involve a preganglionic section. Whether this will make any essential difference in the results in this disease, time alone will tell.

Turning to the actual results, we find that Dr Crile's figures are quite similar to those generally reported in any unselected group of cases. The follow-up is of very short duration—a few months in most cases, somewhat over 1 year in others. No results of as long as two years

duration are given. Most observers would hesitate to draw definite conclusions from these data.

Regarding selection of cases, Dr Crile believes that the patient as a whole must be considered. Thus, physiologic age rather than actual age, the duration of the disease, the stage of the disease, the state of the eyes, heart, and kidneys, and the response to sedation, all must be evaluated. This is in keeping with the feeling of most observers.

Dr Crile believes that after a certain stage of sclerosis has been reached, even if the cause is removed, an irreversible state persists. Even so, he finds that operation may be indicated, largely for symptomatic relief which he obtained in 87 per cent of cases. Some would agree and some would disagree with this.

Seventeen per cent of his cases had normal blood pressure one year after operation. This figure is not significant in a series of unselected patients such as his.

The reviewer believes that the value of any operation for this disease should be judged almost solely by the effect on the blood pressure level. Symptomatic relief is not sufficient justification for surgery. An attempt should be made to select cases which will respond. If further observation of good results shows them to be lasting or permanent, and not accompanied by any deleterious effects on any organs or tissues of the body, then one may fairly conclude that sympathectomy is of real value in the treatment of essential hypertension. Whether the most effective operation has as yet been devised, is still a question.

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*The Treatment of Fractures* Charles L. Scudder Eleventh  
edition 1208 pp Philadelphia and London W B  
Saunders Co., 1938 \$12.00

Progress in fracture treatment calls for constant revision of one's ideas, and the fact that the author, who has been one of the foremost exponents of what has been best in the treatment of fractures, believed that this, his eleventh edition, was called for in order to keep the work up to the times, is conclusive proof that there must be much that is new. The chapter on the use of the fluoroscope in the reduction of fractures is a timely one for those who are not alive to the latent dangers and do not take precautions to avoid them. The various types of skeletal traction and the indications for their employment are well considered, as are the numerous devices for both ambulatory and bed treatment, by extension and counterextension.

Chapters on Birth Fractures, Epiphyseal Injuries, Initial Care and Transportation, Plaster of Paris Splints, Ambulatory Management, The Healing of Fractures, Pathological Fractures, Open or Compound Fractures, Traumatic Shock, Operative Treatment, Qualifications of the Surgeon for the Operative Treatment and Anaesthesia are all of importance and receive excellent treatment by the author's collaborators.

The chapters on methods of fixation and surgical approach to the various fractured bones cover the modern methods of dealing with the different fractures, and special sections are devoted to fractures of the facial bones, head injuries, fractures and dislocations of the vertebral column, injuries to the intervertebral disks, Volkmann's contracture and medicolegal relations. The other chapters on the common fractures and their unusual and exceptional features are brought up to date. All are well illustrated and arranged in an orderly manner for easy reference. This edition maintains the high standard attained by previous editions and holds its own in a field in which there are many worthy competitors.



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## BRONCHOSCOPIC DILATATION OF BRONCHIAL STENOSIS FOLLOWING THORACOPLASTY FOR TUBERCULOSIS\*

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BOSTON

RELATIVELY little has been written about bronchoscopy in tuberculosis, though it is generally recognized that bronchoscopy is indicated in bronchial obstruction, whether due to tuberculosis or other pathologic lesions. Jackson<sup>1</sup> mentions complete bronchial occlusion by cheesy pus and debris from a tuberculous peribronchial node that had eroded through the bronchus. Clerf<sup>2</sup> believes that bronchoscopy is indicated in tuberculosis when unexplained symptoms such as wheezing or dyspnea occur. In cases where tuberculosis was unsuspected he established a positive diagnosis of pulmonary tuberculosis by bronchoscopy. Eloesser<sup>3</sup> has found bronchial stenosis to be frequently due to various tuberculous processes, and has made many bronchoscopic examinations in tuberculosis without ill effect. Myerson<sup>4</sup> reports a series of 60 cases of pulmonary tuberculosis where bronchoscopy was performed, and says that "in not a single instance was there an exacerbation of the disease or a spread to a new area of the lung following bronchoscopy." Ballou<sup>5</sup> has performed bronchoscopy because of the development of asthmatic symptoms in known cases of pulmonary tuberculosis, improvement has resulted from dilatation of stenosis and removal of granulation tissue. Samson<sup>6</sup> in a recent discussion of tuberculous tracheobronchitis states "Bronchoscopically four types of lesions are distinguishable, two or more of which may co-exist in the same patient." These four types are the non-ulcerative and non-stenotic, the hyperplastic, the ulcerative and the stenotic.

With regard to the pathogenesis of tuberculous stenosis of the bronchus following thoracoplasty, it seems probable that some degree of tuberculous tracheobronchitis exists before thoracoplasty is undertaken, and that the collapse of the lung, with possible kinking and compression of the bronchi, results in an approximation of the bronchial sur-

faces, local spread of the tuberculous process, ulceration and stenosis. Samson<sup>6</sup> and his co-workers believe that the ulcerative type of tracheobronchial tuberculosis is more active and virulent than the non-ulcerative, and state that "because of the obviously poor prognosis we do not now recommend any type of collapse therapy for patients with ulcerative tracheobronchial lesions unless subsequent bronchoscopic examinations demonstrate a tendency for the ulcers to heal without the formation of an important stenosis." They believe that collapse therapy is not a responsible etiologic agent. It seems to me that we must postulate a pre-existing tracheobronchial tuberculosis which may well have been activated by the collapse procedure. The importance of bronchoscopy before collapse therapy is undertaken is therefore self-evident in any case where there is a suspicion of tracheobronchial tuberculosis.

Three cases of bronchial stenosis following thoracoplasty for tuberculosis, reported below, have recently come under my care for bronchoscopic examination and treatment. Unfortunately none of the patients had had a preoperative diagnostic bronchoscopy, because the thoracoplasties were performed before the importance of this preliminary procedure had become recognized.

### CASE REPORTS

*Case 1.* E. H. (U No. 85643), a 40-year-old, married, American housewife, entered the Massachusetts General Hospital for bronchoscopy on October 22, 1936. She gave an 8-year history of pulmonary tuberculosis involving the entire right upper lobe, treated at Rutland State Sanatorium and Mattapan Sanatorium with pneumothorax. A right phrenicectomy was done in 1933. First, second and third stage thoracoplasties were done in 1934, following which the patient was discharged home on bed rest, but had intermittent episodes of fever, cough and raising of sputum. On October 4, 1935, x-ray examination of the chest with Lipiodol showed normal filling of the left bronchial tree. The right main bronchus showed a cone-shaped stenosis (Fig. 1) starting about 1 cm. beyond the bifurcation. From October, 1935, to October, 1936, the

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patient continued bed rest at home, having repeated attacks of fever, ranging up to  $103^{\circ}\text{F}$ , with severe cough and a moderate amount of sputum, which was, however, negative for tubercle bacilli.

Because of the x-ray picture of stenosis and the repeated attacks of cough and fever, bronchoscopy was advised and was performed on October 22, 1936. About 1 cm below the carina the right main bronchus was com-

tacks of fever, cough or abnormal amounts of sputum suggesting bronchial obstruction. She gained weight and strength, was up and about and felt like a different individual.

Bronchoscopy on October 14, 1937, showed the sinus to be closed again at its lower end. In view of the great clinical improvement it was assumed that the cavity had fibrosed and no attempt was made to reopen it. Six months later, however, several more attacks of bronchial obstruction occurred, necessitating bronchoscopy on September 29, 1938, at which time the stenosis was again dilated and a considerable amount of thick secretion was aspirated from the bronchus beyond the stenosis. Following this procedure the patient was greatly relieved and has had no further attacks. We believe that bronchoscopy should be repeated in this case about every 3 months in order to prevent recurrent stenosis.

**Case 2** E. J. B. (U No 9232), a 22 year-old, single woman, entered the Massachusetts General Hospital for bronchoscopy on October 22, 1936. She gave a 5-year history of pulmonary tuberculosis, with positive sputum, involving only the right apex, and treated at Rutland State Sanatorium. A right phrenicectomy was done in 1932. A right upper thoracoplasty was done in 1934. Six to 8 weeks following thoracoplasty the patient developed coughing

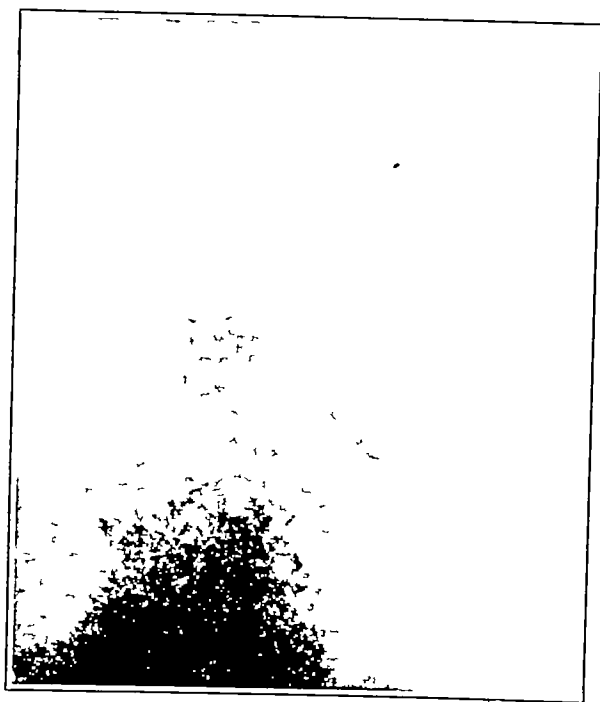


FIGURE 1 Case 1

*X-ray film after Lipiodol injection demonstrating a cone-shaped area above complete stenosis of right main bronchus*

pletely occluded except for a circular opening about 2 mm in diameter. There was no evidence of inflammation in this region and no secretion. A very small (No 8) soft rubber esophageal bougie was introduced into this opening, and seemed to meet complete obstruction when advanced about 3 cm. Larger bougies up to No 11 were introduced and the sinus tract was gently dilated. It was found that bougies could be introduced farther and farther, and finally a small one apparently went in about 6 cm to a definite cavity, from which a considerable amount of mucopurulent material was aspirated. Following bronchoscopy the patient felt much better and had much less coughing. On November 5, 1936, bronchoscopy was repeated. The sinus was found to be wider open than before, and soft bougies up to No 14 were passed through to the cavity without difficulty. Two weeks later bronchoscopic dilatation was again done and the secretion was aspirated into a collector. The stained smear was negative for tubercle bacilli. The same material was injected into a guinea pig, which was also reported negative for tuberculosis. On December 17, 1936, bronchoscopic dilatation was repeated and bougies up to No 16 passed easily through the sinus into the cavity. Smears and guinea pig injection were again negative. Following these bronchoscopic treatments x-ray examination with Lipiodol showed the fistulous tract to fill beyond the stenosis (Fig 2). For 10 months the patient had no further at-

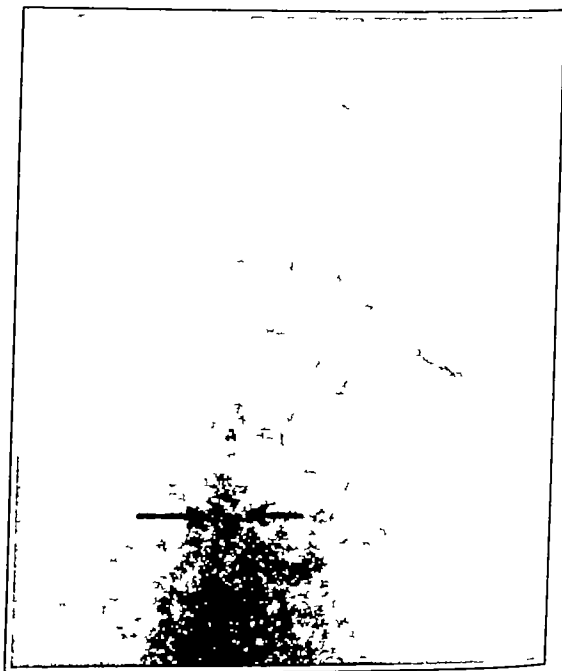


FIGURE 2 Case 1

*X-ray film after Lipiodol injection and after bronchoscopic treatment showing dilatation of sinus tract and the formation of a small cavity*

spells, raising daily about 200 cc. of rather thick, foul sputum. Similar coughing attacks recurred about every 4 months. She was obliged to restrict her activities very markedly. X-ray examination (Fig 3) on September 16, 1936, showed an area of density at the right apex consistent with collapse of the right upper lobe due to occlusion of the bronchus. Lipiodol injection (Fig 4) confirmed this, showing the right upper lobe bronchus to be completely obstructed.

Because of the coughing attacks and x-ray findings,

bronchoscopy was performed on October 22, 1936, and showed the right upper lobe orifice to be reddened and edematous. By means of the Henning esophagoscope, which permits right angle vision into an upper lobe bronchus, a stenosis of the bronchus was demonstrable. This was dilated with esophageal bougies, Nos. 11 to 18, which entered the upper lobe bronchus for about 5 cm. There was very little secretion. Bronchoscopy was repeated on November 18, 1936, and on December 10, 1936, the right upper lobe bronchus being dilated each time. Following these treatments there was less sputum than formerly and it was more easily raised. X-ray examination (Fig 5) in March, 1937, showed much better aeration at the right apex. Sputum examination was negative for tubercle bacilli. The patient was last seen in June, 1938, a year and a half after the last bronchoscopic treatment, she was feeling very well and had had no further attacks of cough, fever or abnormal amounts of sputum. She had been attending art school for the past 9 months.

*Case 3* F. E. F. (U No 3581), a 36-year-old single woman, entered the Massachusetts General Hospital for bronchoscopy on October 29, 1936. She gave a 14 year history of pulmonary tuberculosis, with positive sputum, involving the entire right lung, and treated at the Rutland

bronchoscopy the patient had no signs of obstruction and no colds, and was able to raise sputum more easily. About December 1, however, she had another cold, which was less severe than formerly. Bronchoscopy was repeated on December 17, at which time there was observed a small, whitish plaque of fibrin near the right upper lobe orifice toward the anterior inferior aspect. A small amount of white secretion was collected from this region, which on smear was reported negative for tubercle bacilli. Some of this secretion was injected into a guinea pig, which was reported negative for tuberculosis. The trachea in the



FIGURE 3 *Case 2*

*X-ray film of chest showing density of right apex due to collapse of the right upper lobe*

State Sanatorium. A right phrenicectomy was done in 1930. In 1931 a two-stage complete right thoracoplasty was done, followed 2 years later by an anterolateral thoracoplasty. Three years later (April, 1936) she began having recurrent colds with fever every 2 weeks, which completely incapacitated her for work. Because of these repeated attacks it was suspected that there was intermittent bronchial obstruction, and bronchoscopy was recommended and was performed October 29, 1936. The right upper lobe orifice was found reddened and narrowed. Soft rubber esophageal dilators were passed into the right upper lobe bronchus for about 3 cm and a small amount of thick secretion was aspirated. For 4 weeks following



FIGURE 4 *Case 2*

*X-ray film after Lipiodol injection showing complete obstruction of the right upper lobe bronchus*

region of the upper lobe orifice and above it was somewhat reddened and granular. By means of the Henning right angle vision esophagoscope, introduced through the bronchoscope, a view of the right upper lobe bronchus was obtained, which showed it to be reddened and so narrowed that its bifurcation could not be seen. Esophageal dilators Nos. 8, 10, 14 and 16, were passed into this bronchus. There was very little secretion. Bronchoscopy was repeated in May 1937. Following bronchoscopy the patient raised sputum much more easily and had only two colds over a period of 1 year. She showed marked improvement in strength and was able to return to light work. Three months later, however (September, 1938) it was necessary to repeat the bronchoscopic treatment because of pain in the right manubrial region and difficulty in raising sputum. Bronchoscopy should be repeated in this case about every 3 months.

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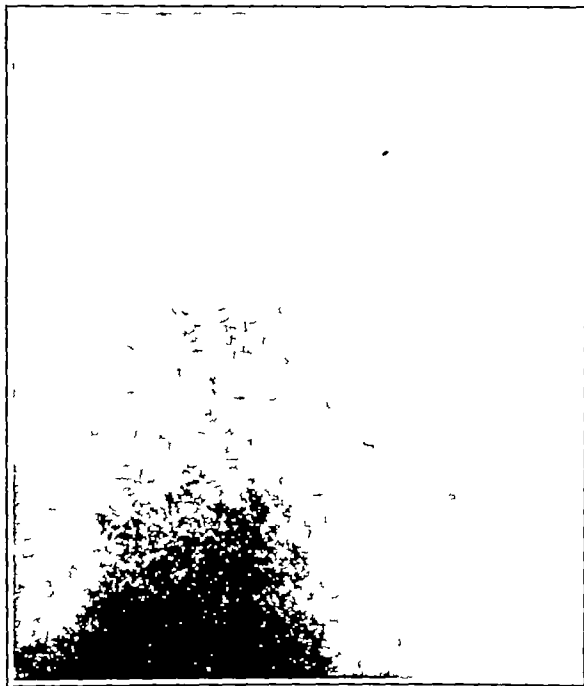


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## ARACHNODACTYL ITS OCCURRENCE IN SEVERAL MEMBERS OF ONE FAMILY\*

JAMES HARRISON, M.D.,† AND MAX J. KLAINER, M.D.‡

BOSTON

**A**RACHNODACTYL or Marfan's syndrome was first described by Marfan in 1896.<sup>1</sup> Since that time there have been numerous references to this disease in European literature, and over 100 cases have been described.<sup>2-7</sup> In America, however, the syndrome was first reported by Piper and Irvine-Jones in 1926,<sup>8</sup> and up to this year we have found only 8 such cases completely described in the American literature.<sup>9-11</sup> During the current year 10 additional cases have been reported.<sup>12-13</sup> We are not including in our figures the several cases reported by ophthalmologists,<sup>14-15</sup> who devote almost their entire description to the ocular abnormalities.

The syndrome embodies a group of developmental defects affecting chiefly the tissues of mesodermal origin, such as the bones, ligaments, tendons, muscles, fat and heart. The major characteristics of the disease are (1) long slender fingers and toes, with a tendency toward claw hands and feet (this first called Marfan's attention to the condition and has given rise to its generally accepted name), (2) underdevelopment of the musculature, with decrease in subcutaneous fat, relaxation of the ligaments and elongation of the tendons, (3) defects in the bony system giving rise to kyphosis, scoliosis, deformities of the sternum and asymmetry of the thorax, (4) congenital abnormalities of the heart, (5) highly arched palate with poor development of the teeth, (6) deformities of the ear lobes, and (7) ocular abnormalities, especially dislocation of the lens with a tendency toward iridodonesis and high myopia. In addition, the pupillary reflexes tend to be sluggish, the pupils react poorly to mydriatics and there is deep physiologic cupping of the disks. It is rare to find a case showing all these abnormalities, but several of them are usually present.

The etiology of the condition is unknown. Various authors<sup>4-9</sup> have mentioned endocrine disorders, mongolism, defects in the development of the neural tube, defects in the germ plasma, and so forth. The consensus is that the disease is hereditary and familial, and develops in intra-uterine life. The purpose of this paper is to report a typical case of arachnodactyl showing prac-

tically all the deformities, and to mention several other members of the same family showing similar defects, thus bringing out the hereditary and familial aspects of the disease.

### CASE REPORT

A 6-year-old girl (Case 30380) was admitted to the Haynes Memorial Hospital in October, 1938, with a mild scarlet fever, from which she recovered without complications.

At birth, this patient, the last of twelve pregnancies, was a 'blue baby' and markedly edematous. At the age of 1

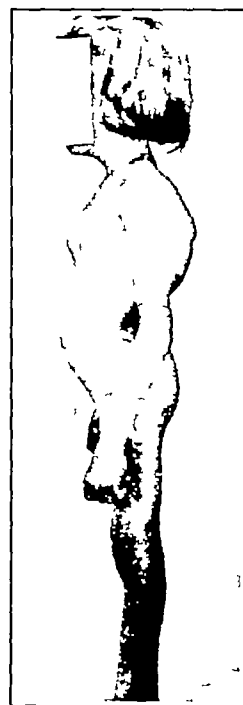


FIGURE 1 Photograph of the Patient

*This view shows the pigeon breast, the dorsal scoliosis, kyphosis and the long thin extremities.*

month contracture of the fingers was noted. At 6 months the presence of a heart murmur, a pigeon breast and dorsolumbar scoliosis was detected. During infancy the child had measles, German measles and whooping cough, and at the age of 4 a severe case of bronchopneumonia. She had always been underdeveloped and delicate, and because of her deformities had attended an outpatient clinic, where along with orthopedic measures she was given a high vitamin diet for rickets.

Physical examination disclosed a poorly developed and nourished child, intelligent and co-operative, with sunken eyes, marked skeletal deformities, long limbs and long, slender fingers with claw hands. She was 44½ inches tall but weighed only 33 pounds. The skull was dolicho-

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## DISCUSSION

It should not be inferred from the good results obtained in these 3 patients that we believe the treatment of tracheobronchial tuberculosis to be always an easy matter. Although there will be some failures, we certainly cannot agree with Myerson<sup>8</sup> that successful dilatation of tuberculous

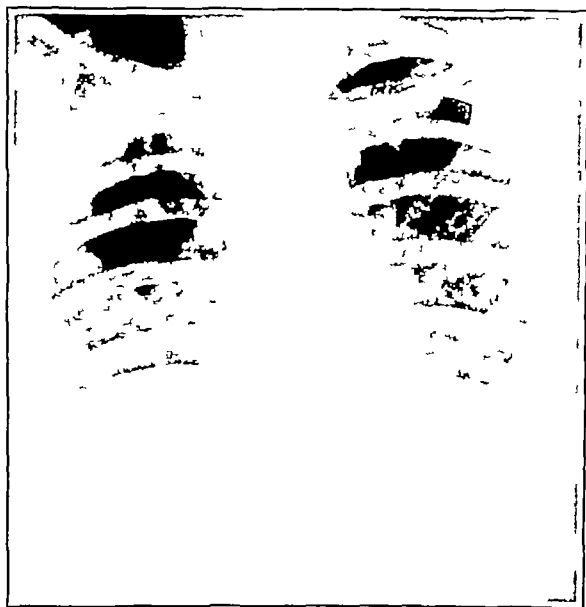


FIGURE 5 Case 2

*X-ray film after bronchoscopic treatment showing relatively good aeration of the right upper lobe*

stenosis is impossible. That such an attitude is unduly pessimistic has been shown by the results in the cases cited above. Samson<sup>6</sup> is quite optimistic in this regard, stating that "localized stenoses

of the stem bronchi can be successfully and repeatedly dilated bronchoscopically" and that "there is often complete remission from wheezing and rhonchi, and from fever due to retained sputum." Samson's opinion is thus in line with our own experience. It should be emphasized that repeated bronchoscopic dilatation may be necessary to secure and maintain an adequate lumen through the area of stenosis. In certain cases, however, as in Case 2, two bronchoscopic treatments have apparently been sufficient. The general rehabilitation of these patients, together with the relief of symptoms, has been noteworthy.

## SUMMARY

Three cases of the stenotic type of tuberculous bronchitis following thoracoplasty are reported. Marked benefit was noted in all 3 cases after bronchoscopic dilatation. In no case did the bronchoscopy reactivate the tuberculosis.

The importance of performing diagnostic bronchoscopy before the institution of collapse therapy is emphasized.

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## DISCUSSION

The scarcity of reports of Marfan's syndrome or arachnodactyly in American literature shows how rare this disease must be. It is perhaps better known to the ophthalmologist because of the high percentage of ocular abnormalities. The disease, however, presents features which are of interest to the internist, pediatrician and orthopedist. Although in many cases the various anomalies can be detected at birth, very often they are first picked up during the course of some intercurrent disease. The lack of subcutaneous fat, poor muscular development, large skull and asymmetric thorax all suggest a feeding problem or a vitamin-deficiency disease and mask the true condition. The deformities of the spine and sternum predispose patients to respiratory infections and pulmonary disorders<sup>12</sup> and the general lack of resistance makes them subject to rheumatic infections.<sup>12, 15</sup> As a result these cases show a high infant mortality and a high morbidity for respiratory diseases, with pneumonia as the commonest cause of death. However, the disease in no way interferes with fertility, and in many cases the life span is not materially affected.

In the case just reported, the patient and her family lend support to the theory of the hereditary and congenital character of this condition. In addition, the presence of hemivertebrae in the lower thoracic spine suggests still another theory as to the etiology, recently advanced by Passow,<sup>16</sup>

who maintains that this is a hereditary neurological disease, with faulty closure of the neural tube, leading to a low-grade, non-progressive syringomelia.

## SUMMARY

There is presented a typical case of Marfan's syndrome or arachnodactyly embodying all the abnormalities of the disease except the major ocular defects. Evidence of the hereditary and congenital character of this condition is supplied.

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## THE DETERMINATION OF SERUM PHOSPHATASE AND ITS CLINICAL SIGNIFICANCE\*

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THE determination of serum phosphatase is one of the more recent laboratory procedures which merits the serious consideration of the clinician. Despite the fact that the test yields valuable information for the pediatrician, the orthopedic surgeon, the internist and even the obstetrician, it has been adopted in relatively few general hospitals. This paper presents a brief report of the method and values obtained in various conditions.

Phosphatase is an enzyme which is able to hydrolyze primary phosphoric acid esters very rapidly at body temperature and has an optimum activity at pH 8.6. The enzyme is found in the

blood and bile, and also in various tissues such as intestinal mucosa, liver, kidney and ossifying cartilage. The enzyme plays an important role in the metabolism of carbohydrate, where it acts in the presence of magnesium in the phosphorylation and hydrolysis of hexose phosphates and glycerophosphates.

The results of the determination are usually expressed in units either according to the method of Kay<sup>1, 2</sup> or that of Bodansky.<sup>3, 4</sup> The unit of Kay is given as the amount of phosphatase in 1 cc of serum that will liberate 1 mg of phosphorus from sodium  $\beta$ -glycerophosphate at a pH of 7.6 in forty-eight hours at a temperature of 38°C. According to this method serum from a normal adult contains 0.10 to 0.21 unit, while children have a higher value, 0.17 to 0.34 unit. The method of

\*Presented at a meeting of the Worcester County Medical Society at Rutland State Sanatorium, October 17, 1938.

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cephalic, with prominent frontal bosses. The hair was blond, straight, coarse and abundant. The pupils reacted sluggishly to light but reacted well to mydriatics, and the eyes were normal in all other respects with the exception of deep physiologic cupping of the disks. The external ears were prominent and the superior aspect of each helix was thin, with rudimentary convolutions. The palate was highly arched, and the teeth were irregular, uneven and poorly developed. There was a marked pigeon breast (Fig 1), with asymmetry of the sternum, and a marked left scoliokypnosis of the thoracic spine. The heart was not enlarged, the rate and rhythm were normal and there were no signs of cardiac insufficiency. However, there was a prominent thrill in the 3rd left intercostal space, with a harsh, rumbling, prolonged murmur pervading all of systole and part of diastole, and transmitted all over the precordium. The lungs and abdomen were negative except for a tendency to a pot belly. The limbs were particularly interesting. The bones were elongated but thin. There was practically no subcutaneous fat and the musculature was very poorly developed. The fingers and toes were long and slender (Fig 2), with prominent clubbing and cyanosis of the nails. The

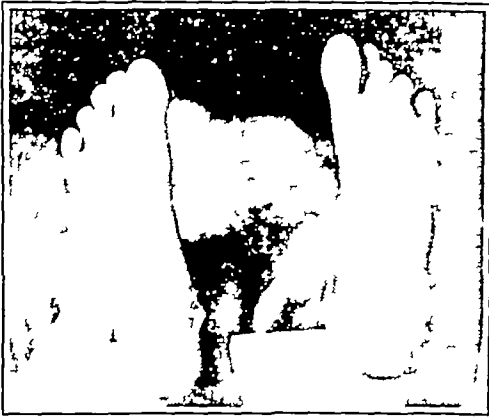


FIGURE 2 Plantar Surface of the Feet

*Note the marked elongation with narrowing of the arch*

fingers were held flexed in the shape of a claw and could not be completely extended. There was a suggestion of acrocyanosis. No muscular palsies and no abnormal neurologic signs were present.

The blood count and urinalysis were normal. A 1:1000 tuberculin test was negative. Wassermann, Kahn and Hinton tests were negative. X-ray films showed thinning and elongation of the long bones, metacarpals, metatarsals and phalanges (Fig 3). The spine showed hemivertebrae in the lower thoracic region, while the skull was essentially negative.

Both the maternal and paternal grandparents were normal and died of natural causes at an elderly age. The father was found to be normal in all respects. The mother, however, the youngest of eight children, presented the same anomalies of her hands and feet as did the patient. The fingers and toes were long and slender and were contracted in claw fashion. Her feet were so long that in spite of the contractures of the toes she was forced to wear a size-8½ shoe. She stated that she had always had a heart murmur. Furthermore, before her marriage she was very thin and undernourished, weighing only 85 pounds. Her second youngest child, an 8-year-old boy, also had the characteristic hands and feet of arachno-

dactyly. The mother's oldest brother had long fingers with large hands and feet and a dorsal scoliokypnosis, and one niece had long fingers and toes, a pigeon breast and



FIGURE 3 X-ray of Left Hand

*The elongation and thinning of the metacarpals and phalanges and the tendency toward a claw hand are clearly shown*

a marked relaxation of ligaments, allowing her to perform acrobatic feats.

Thus, in the family there are no less than 5 cases of varying degrees of arachnodactyly. From the family tree, traced in Figure 4, it is obvious that the maldevelopment in this particular family was inherited from the

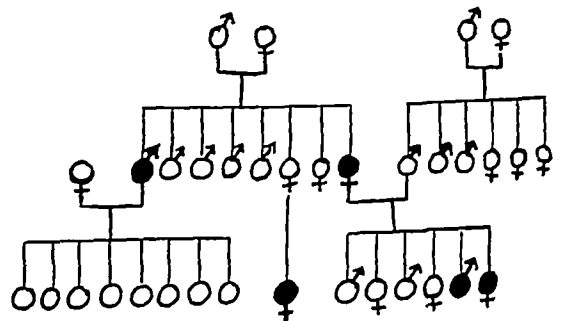


FIGURE 4 Family Tree

*The blackened circles represent individuals with arachnodactyly*

mother by both male and female children. Furthermore, this tendency toward mesodermal abnormalities seems to be a recessive Mendelian characteristic, which can skip one generation only to appear in the second.



diately on the giving of adequate vitamin D therapy, but that the values remain somewhat elevated so long as healing is taking place, and become normal only when the condition is completely cured

In hyperparathyroidism, the elevated values drop to normal after successful operation. Failure of the serum phosphatase to return to normal after operation is therefore an indication that some hyperfunctioning parathyroid tissue has escaped removal. The determination thus becomes a valuable aid to the surgeon.

In primary or metastatic bone cancer the values are usually increased two to five times, up to from 8 to 25 Bodansky units. Bodansky and Jaffe<sup>5</sup> found their highest value of 45.5 units in an osteoplastic type of metastatic bone tumor arising from a carcinoma of the prostate. The osteogenic sarcomas give rise to increased phosphatase values if of the osteoblastic type (Woodard, Twombly and Coley<sup>6</sup>), but not in the osteolytic type. Normal or but slightly elevated values are obtained in chondrosarcoma, giant-cell tumor and multiple myeloma. In the last condition high values for serum calcium and serum protein are frequently found, while the phosphorus values are normal. Slight elevations in the phosphatase levels, up to from 8 to 15 Bodansky units, are found in syphilitic periostitis, osteomalacia and acromegaly. The calcium and phosphorus values are normal in all these conditions except osteomalacia, in which there is a tendency for both substances to be slightly decreased.

The phosphatase values are normal in bone infections, senile osteoporosis, osteogenesis imperfecta and chronic osteitis.

In jaundice the blood serum values are high, this has been shown by Thannhauser and his associates<sup>10</sup> to be due to an activation of the phosphatase present in the serum by some co-factor present in bile. The test has been proposed by Roberts<sup>11</sup> as a means of distinguishing between obstructive jaundice and hepatocellular jaundice. Its value has been denied by Greene, Shattuck and Kaplowitz<sup>12</sup> and by Cantarow and Nelson<sup>13</sup>. On the other hand, Rothman, Meranze and Meranze<sup>14</sup> think that it is of distinct value since the serum phosphatase levels increase in proportion to the bilirubin content in obstructive jaundice but not in other conditions. A similar view is held by Flood, Gutman and Gutman,<sup>15</sup> who state that obstructive jaundice cannot be present if the serum phosphatase is low. It would appear, therefore, that although the procedure does not give a clear-cut differentiation when the values are moderately increased, one can expect that jaundice in the presence of low values rules out the pos-

sibility of obstruction and that extremely high values favor this diagnosis.

In pulmonary tuberculosis with extensive fibrosis and calcification the values may be elevated about 50 per cent above normal. In advanced pulmonary tuberculosis and extensive miliary tuberculosis, on the contrary, low values may occur. A fall in phosphatase values during the course of the disease indicates a grave prognosis, while an elevation is regarded as a favorable sign. An elevation in serum phosphatase has been reported by Meranze, Meranze and Rothman<sup>16</sup> to take place after the sixth month of pregnancy. They state that this increase coincides with the period of marked ossification in the fetus. A failure of the phosphatase to become elevated might therefore be expected in conditions where the bony development of the fetus was interfered with. No evidence substantiating this view has as yet been produced.

The test is also of value to physicians who serve on local boards of health, as a means of detecting the inadequate or improper pasteurization of milk. The enzyme which is present in the mammary gland is excreted in the milk, and is active when the milk is raw. During proper pasteurization the phosphatase is inactivated. If raw milk is added to a solution of sodium phenyl phosphate in a borate sodium hydroxide buffer and incubated for one hour at 37°C there will be a liberation of phenol, which can be detected by the color produced on the addition of 2, 6-dibromoquinone-chloroamide. If proper pasteurization has been carried out the test is negative. If as little as 0.1 per cent of raw milk is added to the pasteurized milk, sufficient hydrolysis of the phenyl phosphate occurs to give a positive test. This amount of enzyme will escape inactivation if the temperature has been held only 1°F below the required one of 143°F, or if the time of holding at the proper temperature has been shortened by five minutes.

A wider use of this test in clinical laboratories seems to be indicated.

#### SUMMARY

The results of serum phosphatase determinations in various clinical conditions are discussed. The test is a valuable adjunct to diagnosis and prognosis in various bone conditions, especially rickets, Paget's disease and osteitis fibrosa cystica. In internal medicine its use in the study of jaundice seems indicated.

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Bodansky is more widely used in this country and gives for a unit the amount of phosphatase in 100 cc of serum that will liberate 1 mg of phosphorus from sodium  $\beta$ -glycerophosphate at a pH of 8.9 in one hour at 37°C when no more than 10 per cent of the substrate has been used up. The values obtained by Bodansky's method are higher than those of Kay, the normal adult having 3 to 5 units and the growing child 5 to 12 units.

The method of Bodansky consists of incubating 1 cc of serum with 10 cc of a solution containing 0.5 per cent of sodium  $\beta$ -glycerophosphate and 0.42 per cent of monosodium diethyl barbiturate (Merck's barbitol sodium) at 37°C for one hour. The mixture is then removed and immediately cooled in ice water, and 9 cc of 10 per cent trichloroacetic acid is added. The precipitated proteins are filtered off and the total inorganic phosphorus determined in 5 cc of the filtrate, or in an aliquot made up to 5 cc with water, by adding 4 cc of 1.87 per cent sodium molybdate in 10 N sulfuric acid and 1 cc of freshly prepared 0.3 per cent stannous chloride. The blue solution thus obtained is compared in a colorimeter with a potassium acid phosphate standard containing 0.02 mg of phosphorus which has been similarly treated. For more detailed information and the precautions to be observed, the original papers of Bodansky<sup>3,4</sup> should be consulted.

High concentrations of phosphatase are found in ossifying cartilage, while only traces are found in non-ossifying cartilage. This has been shown to be due to the phosphatase content of the osteoblastic cells, and the amount of phosphatase is roughly proportional to the bone-forming activity. The phosphatase of the intestinal mucosa is concerned with the splitting of phosphoric esters preparatory to their absorption, that in the kidney is concerned with elimination. In bone formation it is thought that the enzyme acts to form locally a high concentration of phosphate by splitting of glycerophosphate, and thus causes precipitation of calcium phosphate.

In healing fractures, Bodansky and Jaffe<sup>5</sup> reported a slight increase of phosphatase in 4 of 13 adults. Botterell and King<sup>6</sup> made determinations of the phosphatase content of the callus and blood serum of rabbits that had sustained experimental fractures of the radius. They found that there was an increase in the phosphatase of the callus amounting to from three to six times that of the normal bone from the other leg. No increase was noted in the phosphatase content of the serum of the rabbits following fractures of one or both radius. Similar results were obtained by Wilkins and Regen,<sup>7</sup> who found an increase of phosphatase

at the site of the injury, which reached a maximum about the twenty-second day and then declined. The evidence would therefore indicate that no significant change in serum levels of phosphatase occurs during the healing of fractures.

In the table the values for serum phosphatase found in various clinical entities are recorded, together with the levels of calcium and phosphorus usually associated with them.

*Serum Phosphatase Phosphorus and Calcium in Normal and Pathologic Conditions*

DIAGNOSIS	SERUM PHOSPHATASE	SERUM PHOSPHORUS	SERUM CALCIUM
	Bodansky units	mg %	mg %
Normal children	5-12	4-6	10-11
Normal adults	3-4	3-4	10
Osteitis deformans	20-100	4	10
Osteitis fibrosa cystica	20-80	2-3	13-18
Osteomalacia	8-15	3	9
Acromegaly	8-15	4	10
Osteogenic sarcoma			
Osteoplastic type	8-13	4	10-11
Osteolytic type	4-5	4	10
Bone cancer primary or metastatic	8-25	4	10
Myeloma	3-5	4	13-15
Bone infection senile osteoporosis and chronic osteitis	3-5	3-4	10
Rickets	15-40	2-4	8
Icterus	8-50	4	—
Hypernephroma of kidney	18-25	4-8	10-11
Advanced tuberculosis	2-3	4	10
Tuberculosis with extensive fibrosis	4-6	4	10
Pregnancy	6-23	3	10-12

In conditions affecting bone, the highest values are obtained when there is marked bone activity, either in the formation of new bone or the destruction of old bone. Thus we find that in osteitis deformans (Paget's disease), hyperparathyroidism (osteitis fibrosa cystica) and rickets the phosphatase levels may be increased ten to twenty times above the normal values. However, in osteitis deformans the calcium and phosphorus values are normal, while in hyperparathyroidism the calcium is elevated and the phosphorus is low, and in rickets both calcium and phosphorus are low. The severity of the condition in all three diseases is indicated by the extent to which the serum phosphatase is elevated.

In rickets the level of the serum phosphatase gives the most reliable single index for evaluating early and doubtful cases. Barnes and Carpenter<sup>8</sup> found that while only 26.7 per cent of 187 cases clinically diagnosed as rickets were detected by x-ray and only 19.8 per cent by low phosphorus values, 65.8 per cent had serum phosphatase values above 12.5 units, which is taken as the upper limit of normality. On giving 800 Steenbock units of vitamin D daily they found an average drop in phosphatase from 58.3 to 12.7 units in three months. It has been shown that initially high values of phosphatase in active rickets begin to drop imme-

diately on the giving of adequate vitamin D therapy, but that the values remain somewhat elevated so long as healing is taking place, and become normal only when the condition is completely cured

In hyperparathyroidism, the elevated values drop to normal after successful operation. Failure of the serum phosphatase to return to normal after operation is therefore an indication that some hyperfunctioning parathyroid tissue has escaped removal. The determination thus becomes a valuable aid to the surgeon.

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## PULMONARY MONILIASIS\*

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**B**RONCHOMONILIASIS may occur alone or in association with tuberculosis or other chronic pulmonary disease. The causative agent, a monilia, is a fungus widely distributed in nature, usually in the saprophytic form. It is present on dead leaves and decomposed wood, and in man and animals is often found on the skin and mucous membranes. Under certain conditions its role may change from the saprophytic to the parasitic form, and it then produces cutaneous, bone, visceral, mucous membrane or pulmonary lesions. In 6 of 178 consecutive cases of pulmonary infections Keiper<sup>1</sup> isolated moniliae in the sputum, and this organism was proved to be the cause of the infection in each case, on the other hand moniliae were found in only 3 throat cultures from 100 normal individuals, none of whom had signs or symptoms of infection. Bronchomoniliasis is no longer rare, according to Ikeda,<sup>2</sup> but the diagnosis must be made with extreme caution, because the organism is found frequently in sputum and secretions from the upper respiratory tract in normal individuals and particularly in patients suffering from chronic pulmonary infections, especially pulmonary tuberculosis and carcinoma.

Bakst, Hazard, and Foley<sup>3</sup> and Davis and Warren<sup>4</sup> have reviewed the literature and classified the pulmonary disease into three types.

The mild type, which may not affect the general health of the individual to any great extent. There is a cough with mucopurulent sputum, and usually no hemoptysis or fever. Physical examination of the chest may reveal scattered fine rales. The condition may persist for several months or may progress to a more severe form.

The intermediate type, which may simulate either bron-

chitis or early pulmonary tuberculosis. Fever, cough, mucopurulent sputum, occasionally blood streaked sputum, dyspnea, and localized or generalized fine or coarse rales are frequently observed.

The severe type, in which the history and physical signs are very similar to those of well advanced pulmonary tuberculosis. General malaise, loss of weight, dyspnea, fever and cough are usually present, and often blood streaked sputum, chest pains, rales and signs of pleural thickening and consolidation.

The outcome in the last group of cases is frequently fatal. Stovall and Greeley<sup>5</sup> point out that the striking thing about most of these cases is the disproportion between the symptoms and the pathologic changes. The patient usually has only a moderately severe cough, and but little sputum, which is mucopurulent rather than purulent, and may be blood-tinged. Fever, if any, is of a low grade, and the leukocyte count is essentially normal. There is frequently a history of pneumonia or influenza, and some patients have had asthma for several years.

Black and Eddy<sup>6</sup> reported a case involving the lungs, skin, subcutaneous tissue and bones which had previously been studied, and in which diagnoses of syphilis, tuberculosis and leprosy were suspected before the final diagnosis of moniliasis was made and confirmed by laboratory study. Jones and Martin<sup>7</sup> report the finding of yeastlike organisms in the vaginal tracts of 52 pregnant and 16 non-pregnant women. *Monilia albicans* was found in 19 of these cases. Fawcitt<sup>8</sup> studied a group of cases of pulmonary moniliasis in conjunction with his work in pneumoconiosis. He found pulmonary mycoses in various types of farm and dairy workers, and distinguished these infections clinically from pneumoconiosis by the occupational history, roentgen-ray findings, and mode

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of onset, which is acute in bronchomycosis, and gradual, with a history of long exposure to silica, in pneumoconiosis

It is evident that the pathologic conditions due to monilia present numerous problems in diagnosis. The finding of budding yeast cells and mycelia in any of the routine stains or cultures should aid in the diagnosis. Yeast cells are generally found in the original smears, stained by any of the usual methods, before further bacteriological study has been attempted. In order to classify the organism, however, its cultural characteristics must be studied. Davis and Warren<sup>4</sup> have described a simple method for the study of broth culture in unstained preparations. Martin et al<sup>9</sup> published a classification of the various forms of monilia.

In the following case, yeast cells were found by our pathologist, Dr Alvin O Severance, in all the direct smears of sputum. Methylene blue, Gram and acid-fast stains were equally efficient in revealing budding cells and mycelia, whether the smears were made directly from sputum or from culture media. A culture of the organism was studied by Dr Donald S Martin, of Duke University School of Medicine, and was classified by him, through cultural characteristics, as *Monilia albicans*.

#### CASE REPORT

A 57 year-old farm worker was seen September 27, 1935, with a chief complaint of weakness. He stated that he was perfectly well until 1 week before entry, when he developed a cold with cough but no sputum. He then became progressively weaker, and developed dyspnea on slight exertion, and anorexia. His usual work became more difficult to accomplish, and just prior to entry he was unable to do any work whatsoever due to marked fatigue. There were no other complaints. The past history was essentially negative, except for a fracture of the 10th left rib 9 months previously, at which time a roentgenogram had been taken (Fig 1).

Physical examination revealed a very well-developed, well nourished man, who appeared weak and definitely ill. The nose and throat were normal. The lungs were clear. Tactile and vocal fremitus and breath sounds were within normal limits, and no rales were heard either before or after cough. The heart was normal. The blood pressure was 140/85. Abdominal and rectal examinations were negative. The temperature was 101°F. The white-cell count was 8850, with a normal differential. Urinalysis was entirely normal.

Bed rest and treatment for upper respiratory infection were started. The temperature remained elevated, the cough continued without sputum and the physical examination was unchanged until the 3rd day after admission, when examination of the chest revealed diminished tactile fremitus over the left midchest and base posteriorly, with diminished breath sounds and fine rales in this region. The findings were suggestive of a pneumonic process, and a roentgen ray examination revealed obliteration of both diaphragm shadows. The lung markings were increased at both bases, there was haziness in the left lower lobe, and

a dense shadow filled the right base, the upper border of which was markedly irregular in outline. There was also a moderately dense, enlarged right hilus shadow (Fig 2). After viewing the roentgenogram, examination of the chest was repeated, but no rales could be heard on the right side. On the following day (the 4th after admission), however, fine rales were heard over the right base

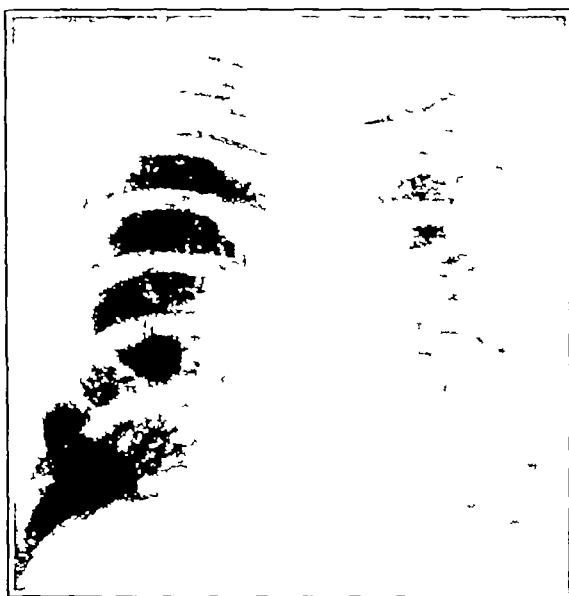


FIGURE 1

*This roentgenogram, taken December 7 1934 when the patient had a fracture of the tenth left rib shows moderate thickening of the bronchial tree with no evidence of pulmonary infiltration. There is a suggestion of calcification in the shadows in the hilus especially those on the right side.*

as well as the left, and over the left midlung field posteriorly. The patient raised a small amount of thick, brown, tenacious sputum, which was smeared and cultured. No acid fast bacilli were seen, but in all smears there were many yeast cells. Suspecting that the yeast was a contaminant, we instructed the patient to wash his mouth and throat well with saline solution, after which another sputum specimen was obtained, similar to the first. Yeast cells were found in all the stained smears of this specimen. Because of the similarity of these organisms to moniliae, the patient was given potassium iodide, 15 gr three times daily. The lung findings remained essentially unchanged, the cough continued and the sputum increased, with a larger number of budding cells and mycelia in each subsequent specimen until the 10th day, when the temperature, which had gradually subsided, had become normal. A roentgen film of the chest on this day showed calcification at the line of fracture of the 10th left rib posteriorly. The cardiac borders were indistinct in outline and merged with moderately dense hilar and perihilar shadows. Peribronchial thickening and fine mottling was evident in the right lung, extending toward the base. The lower two thirds of the left lung field was mottled, and there were dense, confluent patches throughout this area. There was a faint outline of a large node in the right hilus, and a dense shadow in the left hilus consistent with a calcified node.

The patient began to improve clinically. His appetite increased, the cough and sputum decreased, physical examination showed diminution of abnormal lung findings, and on the 17th day was negative except for fine rales in



FIGURE 2

*This film, taken on September 30 1935 three days after admission, when the first signs of pulmonary disease were detected clinically reveals dense shadows in both bases, which have obliterated the diaphragm, marked infiltration in the periphery, especially on the left, both apices clear, and definite calcification of the lymph nodes of the hili, more marked on the right*

both bases. Roentgenograms taken this day showed the right border of the heart more distinctly. The hilar shadow on the right was less dense. Both diaphragm shadows were seen, the left being clearer than the right. There was a minimum of haziness in the right costophrenic angle. Peribronchial thickening was unchanged at the right base. More diffuse mottling and peribronchial thickening were seen in the left base, with loss of the larger conglomerate patches. The cough continued to subside and the sputum became increasingly less until the 24th day following admission, when the sputum showed only one colony of yeast cells on culture. Roentgen films at this time showed the right diaphragm more distinctly than theretofore, and a clear costophrenic angle and slightly diminished peribronchial thickening. The mottling in the left lung field was more diffuse, with a considerable amount of beading along the peribronchial vessels. The patient's activity was gradually increased after the 25th day, and by the 31st day he felt perfectly well and had no fatigue following moderate exercise, while examination revealed only an occasional fine rale in either base, and a roentgenogram showed the heart and diaphragm shadows more distinctly. The peribronchial thickening and mottling had diminished, and there were very few residual pathologic findings.

The patient was discharged on the 31st day (October 28), and returned to work December 3. Roentgen films of the chest taken then and December 26 showed an increase in pulmonary markings in both bases.

There was no apparent variation in the peribronchial thickening when the roentgen film taken December 7, 1934 (Fig 1), was compared with the follow-up roentgenogram taken April 9, 1937 (Fig 3). The latter, however, showed the calcified hilar nodes more distinctly. There has been no evidence of recurrence.

Bakst et al.<sup>3</sup> describe a very acute form of pulmonary moniliasis which may have a sudden onset with rapid progression to a fatal termination. The case reported here may be classified in this group because of the sudden onset and the rapid progression, but it is unique in that it terminated in complete recovery in a relatively short time. In any unusual type of pulmonary lesion the possibility of moniliasis must be considered, and appropriate therapy instituted if this condition be found.

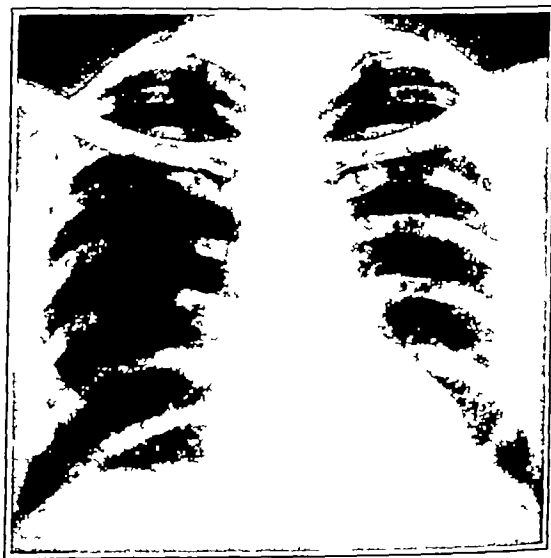


FIGURE 3

*This roentgen film, taken for follow up on April 9, 1937, shows the periphery clear, the bronchial tree not increased in density (compare with Fig 2) and calcification in the hili*

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## REPORT ON MEDICAL PROGRESS

## TUMORS OF BONE

CHANNING C SIMMONS, M.D.\*

BOSTON

UNTIL Ewing suggested the term "osteogenic tumor," which has now been generally adopted, the nomenclature of the primary bone tumors was confusing. The embryonic fibroblast is assumed to be the cell of origin of all these tumors, and this cell is capable of developing into any form of mesoblastic tissue—relatively adult fibrous tissue, cartilage or bone. Many or all these tissues are usually found in a primary bone tumor, although usually one predominates. The terms fibro-, chondro-, osteo- or anaplastic may be used as prefixes or adjectives to designate the predominating type.

In 1921 the committee of the Registry of Bone Sarcoma of the American College of Surgeons, together with a committee from the American Association of Pathologists and Bacteriologists, formulated a classification based on the above premise. This has since been generally adopted in this country, and with slight modifications will be followed in this article. It leaves much to be desired but is the most comprehensive yet suggested. Reticulum-cell sarcoma and liposarcoma have been added, for they have been recognized as entities by the committee.

In 1931 Geschickter and Copeland<sup>1</sup> published a book in which they advocated a radically different classification, presumably based on embryology. It is impossible to reconcile their classification with that of the registry, which does not attempt to postulate the highly doubtful embryologic stages at which bone tumors may arise. Several pathologists have also suggested classifications which, however, are somewhat confusing to the clinician.

The Registry classification of bone tumors is as follows:

## Tumors originating in bone

## Osteogenic tumors

Benign osteoma, chondroma, etc.

Malignant (osteogenic sarcoma) periosteal, sclerosing, chondral, etc.

## Ewing's sarcoma

## Reticulum-cell sarcoma

## Liposarcoma

## Myeloma (plasma-cell tumor)

## Unclassified malignant tumors

## Benign giant-cell tumor

## Angioma

## Other bone tumors

Metastatic tumors cancer, hypernephroma, lymphoma, etc.

Parosteal fibrosarcoma

Odontoma, etc.

Other conditions subperiosteal hematoma, bone cyst, osteitis fibrosa cystica, Paget's disease, sarcoid, xanthoma, etc.

## BENIGN OSTEOGENIC TUMORS

The non-malignant osteogenic tumors are composed of nearly normal bone, cartilage and fibrous tissue in varying amounts. A common seat for these tumors is about the joints or beneath the fingernails or toenails. When cartilage predominates there is always a possibility of malignant change, and these tumors should be completely removed by surgery. An osteoma should be removed when it is in an accessible situation or causing symptoms, for the borderline between benign and malignant tumors cannot be ascertained.

Multiple exostosis is a congenital condition in which such osteocartilaginous tumors occur near the epiphyseal lines in a few or many bones. Rarely one or more of these become malignant.

## MALIGNANT OSTEOGENIC TUMORS (SARCOMAS)

Sarcoma of the bone is a particularly malignant tumor, but the degree of malignancy and the prognosis following treatment have been shown to depend to a large extent on the amount of differentiation of the cells in the major portion of the growth (Meyerdig,<sup>3</sup> Simmons<sup>2</sup>). Thus tumors composed chiefly of cartilage, bone or fibrous tissue have a better prognosis than those composed chiefly of undifferentiated cells. The malignancy also varies somewhat according to the location. In the jaw or flat bones the tumor runs a somewhat different course than is the case in a long bone. Tumors of the phalanges of the fingers or toes rarely cause metastases, even though the histology suggests malignancy. The undifferentiated anaplastic form is the common type seen in children.

Osteogenic tumors usually arise in the epiphyseal ends of the long bones, and in most cases are both subperiosteal and medullary, as well as osteolytic and osteoblastic. They are composed of all types of mesoblastic tissue in varying proportions, and the prefixes osteo-, chondro-, myxo-, and so forth, are used as adjectives to describe the predominating tissue. Metastases commonly take place

through the blood stream and are usually found in the lungs. A form of low malignancy, composed chiefly of fibrous tissue and confined to the medulla, is recognized.

The first symptom of osteogenic sarcoma is usually pain in a bone, not relieved by rest and often referred to the adjacent joint. The tumor becomes demonstrable after a varying period depending on the point of origin, that is, whether medullary or periosteal. The late symptoms are well known. The importance of trauma as an etiologic factor is disputed, but a history of a recent injury to the part is often obtained.

The radiograph ordinarily shows a tumor at the end of a long bone, the appearance varying somewhat according to the situation, that is, whether chiefly subperiosteal or central, and also according to whether the tumor is osteolytic or osteoblastic. In very early cases the film may be negative, but by the time the symptoms are sufficiently pronounced for the patient to seek medical advice, bone changes are usually evident. There are always bone destruction and bone formation in varying amounts. The periosteum may be pushed up with ray formation beneath it, and the so-called "reactive triangle," where the periosteum joins the shaft at the upper end of the growth, is often seen. When the tumor has attained considerable size the shadow of the shaft is faintly seen through it. In the film the rare, central, fibrous type closely resembles a giant-cell tumor and may be confused with it.

The symptoms, history and physical examination, as well as the radiograph, should all be considered in arriving at a diagnosis for many atypical films are seen. Chemical analysis of the blood is at times of aid in making a diagnosis (Table 1), but the findings should be care-

lung metastases within three years is the usual story. Tumors composed of relatively adult tissue permit a comparatively good prognosis. Lung metastases developing five or more years after removal of the primary growth are occasionally seen. The experience of surgeons whose practice is limited to children is most pessimistic. Simmons<sup>2</sup> in a small series of consecutive cases reports 39 per cent five-year cures, and Meyerding<sup>3</sup> in a larger series 23 per cent.

Amputation through the bone next proximal to that diseased or disarticulation is the treatment of choice. It is generally agreed that the tumors are radio-resistant. In the Registry of Bone Sarcoma there are 101 five-year cures following surgery and 1 following radiation treatment, but in the latter case the diagnosis was not confirmed by biopsy. The operation should not be done if there is evidence of remote metastases, except for the relief of pain, which at times may be controlled by radiation or chordotomy. The treatment by the mixed toxins of streptococcus and *Bacillus prodigiosus* (Coley's serum) has been advocated, but proof of its efficacy has not been supplied. B. L. Coley<sup>4</sup> employs it only in endothelial myeloma and in conjunction with surgery in the hope of destroying microscopic foci in the lungs. Brunswick<sup>5</sup> found that experimentally it had no effect on animal tumors but concluded "It has not been proved at present to be totally ineffective in all cases."

EWING'S SARCOMA

Ewing's sarcoma, or endothelial myeloma, is probably the small round-cell sarcoma mentioned by earlier writers. It usually arises in the shaft of a long bone or in the flat bones, and is charac-

TABLE 1 Blood Constituents in Cases with Bone Tumors

	OSTEITIS FIBROSA CYSTICA	OSTEOGENIC SARCOMA	EWING'S SARCOMA	GIANT CELL TUMOR	MYELOMA	METASTATIC CANCER	PAGE'S DISEASE
Calcium	Increased	Normal	Normal	Normal	Often increased	Normal	Normal
Phosphorus	Diminished	Normal	Normal	Normal	Normal	Normal	Normal
Phosphatase	Slightly increased	Usually increased	Normal	Normal	Normal	At times slightly increased	Usually high
Serum protein	Normal	Normal	Normal	Normal	Often increased	Normal	Normal
Bence Jones (urine)	Absent	Absent	Absent	Absent	Often present	May be present	Absent

fully interpreted. A biopsy is often necessary for confirmation. This should be done with a tourniquet in place and with permission secured for immediate amputation should the tumor prove malignant. Such permission is often difficult to obtain, and the family grasps any form of treatment, short of sacrificing a limb, that may be of benefit.

The prognosis depends on the type of the tumor, its duration and its situation. Death with

terized by bone destruction with no tumor bone formation, although there is occasionally some reactive new bone.

The early symptoms are pain and swelling, often with remissions. There may be a slight rise of temperature with an elevated white-cell count. In the late stages the temperature may rise to 103°F. Metastases take place to the lungs and to other bones, the skull being a common site.



The chemical constituents of the blood are normal

The x-ray films show bone destruction, often with a characteristic onion-skin appearance of the periosteum. There may be reactive bone formation. The films are sometimes confused with those of a xanthoma or reticulum-cell sarcoma.

The disease with which it is most commonly confused in the early stage is osteomyelitis, but xanthoma and reticulum-cell sarcoma should always be considered.

The prognosis is bad. The disease may run an acute course, but the average length of survival is two or three years. In 14 of the 236 cases in the Registry of Bone Sarcoma the patients have lived over five years. Thirteen of these 14 cases were treated by surgery, often supplemented by Coley's serum or radiation, and 1, after biopsy, by radiation and Coley's serum only.

The tumor is very radio-sensitive, and following treatment the local growth practically disappears, but metastases occur. Amputation or resection is the treatment of choice. Treatment by Coley's serum has been recommended, and seems to be of greater value in the treatment of this tumor than in that of osteogenic sarcoma.

#### RETICULUM-CELL SARCOMA

Reticulum-cell sarcoma is a tumor usually placed in the group of malignant lymphomas. It has been recognized as occurring in the reticuloendothelial system but recently has been shown to arise in a single bone to which it is apparently limited (Parker and Jackson<sup>6</sup>). The symptoms are similar to those of osteogenic sarcoma. Although the tumor may reach a large size, the general condition of the patient remains excellent and metastasis is slow to occur. The x-ray in the early cases shows central bone destruction. Later a large part of the bone may be destroyed, with some new-bone formation. The prognosis is relatively good even when the tumor has attained a large size. The tumors are radio-sensitive but the therapeutic results are apparently better following radical surgery, although the patient may develop similar tumors in other parts of the reticuloendothelial system many years later.

#### LIPOSARCOMA

Primary liposarcoma of bone described by Stewart<sup>7</sup> is a rare form of tumor derived from the fat cells. Its clinical behavior is similar to that of osteogenic sarcoma.

#### MYELOMA (PLASMA-CELL TUMOR)

This is a tumor of the bone marrow composed of plasma cells. It is usually multiple, chiefly affect-

ing the flat bones, but is occasionally limited to one bone (Cutler, Buschke and Cantril<sup>8</sup>). It is most frequently seen in adult males. The symptoms are pain, tumor and those due to bone deformity. Bence-Jones protein may be present in the urine, and plasma cells in the blood smear. The serum globulin may be increased. None of these findings are constant or to be found in every case. The disease runs a course, unaffected by treatment, of a few months to many years. There is 1 case in the Registry of Bone Sarcoma in which the patient was living and in good health twenty years after the diagnosis had been established by biopsy. The classical x-ray film shows centrally placed multiple areas of bone destruction, but atypical radiographs are common. The treatment is symptomatic and by radiation. The growths are usually radio-resistant, but occasionally respond satisfactorily.

#### BENIGN GIANT-CELL TUMOR

Benign giant-cell tumors arise most commonly in the epiphyseal ends of the long bones. They are not primarily malignant growths, although malignant change apparently occurs after a period of time in about 7 per cent of cases (Simmons,<sup>9</sup> Codman<sup>10</sup> and Stewart<sup>11</sup>). The tumors arise in the medulla and cause bone destruction and distention of the cortex, with no new-bone formation.

The symptoms are pain, tumor and later pathologic fracture. There may be collapse which causes deformity of the adjacent joint.

The x-ray film shows a cavity in the medulla near the joint, with bone destruction and absorption of the cortex, with distention. The cavity may appear to be divided by fine trabeculae. At the lower limits of the growth there is a sharp concavoconvex line of demarkation, above, it is limited by the epiphyseal or joint cartilage. One form is seen in young individuals, usually arising in the greater tuberosity of the humerus or the trochanter or condyle of the femur, which extends across the epiphyseal line. These tumors contain cartilage and may be confused with sarcoma (Codman<sup>12</sup>).

The diagnosis is made on the symptoms and on the radiograph. Bone cysts, the fibrous type of osteogenic sarcoma, angioma and metastatic tumors are the chief conditions with which it may be confused.

The majority of these tumors are non-malignant, and amputation is not indicated except for deformity or where other forms of treatment have failed. The choice of treatment lies between radia-

through the blood stream and are usually found in the lungs. A form of low malignancy, composed chiefly of fibrous tissue and confined to the medulla, is recognized.

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terized by bone destruction with no tumor bone formation, although there is occasionally some reactive new bone.

The early symptoms are pain and swelling, often with remissions. There may be a slight rise of temperature with an elevated white-cell count. In the late stages the temperature may rise to 103°F. Metastases take place to the lungs and to other bones, the skull being a common site.

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CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25151

## PRESENTATION OF CASE

*First Admission* A forty-five-year-old, white, married, schoolteacher was admitted complaining of sore throat.

Two days before admission she had a sore throat, chill and backache. Her temperature was 101.8°F. On the following day her blood had a white-cell count of 1000, with no polymorphonuclears, and when repeated showed 750 cells, with no polymorphonuclears. About two years before entry she began having urinary frequency and urgency. Nine months later a small piece of chronically inflamed tissue was fulgurated on the edge of the left ureteral orifice. The bladder healed readily, but the patient complained of the same symptoms throughout the following year. Her physician thought that these complaints were psychogenic. During the two years she had taken Allonal and Peralga quite often, using the former practically every night during the previous three or four months.

Physical examination showed a thin woman with a mottled, purplish complexion. The posterior nasopharynx was acutely inflamed and showed a right linear ulceration. There were a number of large external hemorrhoids.

The blood showed a red-cell count of 5,100,000 with 80 per cent hemoglobin. During the first nine days in the hospital the white-cell count ranged between 1500 and 3400, with polymorphonuclears varying between 0 and 20 per cent. The tenth day she had a white-cell count of 7400 with 55 per cent polymorphonuclears.

She rapidly improved and was discharged on the nineteenth hospital day.

*Second Admission* (three years and three months later) The patient complained of constipation of several years' duration, more recently accompanied by headaches.

Barium enema x-rays showed a large atonic colon. A gastrointestinal x-ray series was negative. Blood and urine examinations were normal. She was discharged on the third hospital day.

*Final Admission* (fifteen months later) Six days before admission she had had a severe head-

ache and a chilly feeling, followed by a temperature of 104°F. Her throat was sore. The next day she felt cold, became nauseated and vomited. Two days later she had pain over the left face and ear, with headache. Her nausea continued. On the morning of the day of admission she was deeply jaundiced. She had taken no drugs except laxatives since her first admission. Nine days before entry she had had injection treatment for hemorrhoids.

Physical examination showed a jaundiced acutely ill woman. The throat was acutely red. The eardrums were negative. Examination of the chest was negative. The liver was not palpable and by percussion was thought to be smaller than normal.

The temperature was 102.5°F., the pulse 115, and the respirations 22.

Examination of the urine showed the presence of a small amount of bile. The blood had a red-cell count of 3,050,000 with 45 per cent hemoglobin, and a white-cell count of 11,400 with 87 per cent polymorphonuclears. There was moderate achromia and variation in size of the red cells, with many of them larger than normal, there was an occasional elongated cell and a rare stippled cell. The platelets were normal. The nonprotein nitrogen of the serum was 19 mg. per 100 cc., the icteric index 50. A stool examination was guaiac positive. A throat culture was negative for hemolytic streptococci but showed *Staphylococcus aureus*. A blood culture was negative at the end of eighteen hours but on the third day showed *Staphylococcus aureus* in both flasks.

X-ray films of the chest were negative. On the second hospital day the icteric index was 70. On the fourth hospital day the patient was much worse, her temperature being 103.5°F., where it had remained for the previous two days. She rapidly failed and died on the sixth hospital day.

## DIFFERENTIAL DIAGNOSIS

DR. CHARLES L. SHORT This patient's first admission can be dismissed in a few words. She evidently had agranulocytosis due to the ingestion of drugs containing amidopyrin since both hypnotics mentioned at that time contained this drug. Recently the manufacturers of Allonal have changed the amidopyrin to acetophenetidin (phenacetin), which rarely, if ever, has caused agranulocytosis. We know that the agranulocytosis is usually primary and that the infection, in this case a nasopharyngitis with ulceration, comes later. The record gives us no information as to whether she recovered spontaneously or following the usual measures used for treating agranulocytosis. The case for the drug etiology of agranulocytosis is

tion and surgery Good and occasionally poor results have been obtained by both methods

When the tumor is in an accessible position, such as the upper end of the fibula or the lower end of the ulna, resection is to be advised on account of the possibility of malignant change In other situations, such as about the knee, a common seat for the tumor, the choice lies between radiation treatment and conservative surgery, that is curetting, and excision of the entire tumor The resulting defect does not entirely fill in with new bone, and if it is filled with bone chips, they are usually absorbed Amputation is at times indicated (Brunschwig<sup>13</sup>)

#### ANGIOMA

Central angioma of bone is a relatively rare tumor The symptoms are similar to those of all primary bone tumors The growth arises usually near the epiphyseal ends of the long bone, causing bone destruction and distention of the cortex The radiograph closely resembles that of giant-cell tumor, but the trabeculae are usually more marked, giving a soap-bubble appearance The treatment is the same as that of giant-cell tumor

#### METASTATIC TUMORS

The possibility of a bone tumor's being a metastasis of a malignant growth arising elsewhere in the body should always be considered Any malignant tumor may form bone metastases, although this is commoner in some forms than in others In children, adrenocortical tumors often metastasize to the bone and the radiograph cannot be distinguished from that of osteogenic sarcoma In adults, cancers of the breast, prostate and thyroid and hypernephroma are the commoner ma-

lignant tumors forming bone metastases These may be either osteolytic or osteoblastic Carcinoma of the thyroid usually metastasizes to the skull, ribs or vertebrae, while cancer of the breast may give either form of metastasis, in any bone of the body

One should always consider the possibility of an apparent bone tumor's being a manifestation of a generalized metabolic disease, such as osteitis fibrosa cystica or Paget's disease

#### PAROSTEAL FIBROSARCOMA

This tumor arises in the outer layers of the periosteum and involves the bone secondarily It is somewhat less malignant than true osteogenic sarcoma and may be of neurogenic origin (Hodges, Phemister and Brunschwig<sup>14</sup>)

205 Beacon Street.

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after three days of incubation. Non-pathogenic coagulase-negative strains of staphylococci characteristically grow quite slowly, hence it was my belief that this patient was suffering from an infection with a relatively avirulent strain of staphylococcus, as a result of a breakdown of the normal bactericidal defense mechanism that was occasioned by some serious underlying disease. She received no sulfanilamide at any time as the sulfanilamide compounds have not as yet been demonstrated to be effective in staphylococcal infections.

DR RICHARD B KING: At the time of the first admission it was apparent that she had agranulocytosis. She had a tremendous amount of treatment—40 cc of Pentnucleotide and 6 cc of liver extract daily, and so forth.

In relation to the last illness it is true that she developed a middle ear sufficient to warrant Dr Reynolds's calling in an ear man to see her, the red eardrum and the earache subsided in twenty-four hours.

#### CLINICAL DIAGNOSIS

Acute yellow atrophy

#### DR SHORT'S DIAGNOSES

Septicemia, *Staphylococcus aureus*  
Pylephlebitis  
Multiple liver abscesses

#### ANATOMICAL DIAGNOSES

Septicemia, *Staphylococcus aureus*  
Multiple abscesses of lungs and kidneys  
Acute glomerulonephritis  
Acute hepatitis  
Icterus  
Ascites  
Gastric erosions, acute, multiple

#### PATHOLOGICAL DISCUSSION

DR MALLORY: The autopsy showed an extremely large liver extending 8 cm below the costal margin, almost to the umbilicus. It weighed 2800 gm. It was slightly greenish in color and quite normal in consistence, and outside of some obvious bile stasis we could not be sure anything was wrong with it. The lungs showed scattered abscesses, as also did the kidneys. The rest of the gross examination was essentially negative.

The findings on microscopic examination proved of interest because in the kidneys, in addition to the scattered abscesses, we found a typical, acute, diffuse glomerulonephritis of a very severe grade. Glomerulonephritis is not a recognized consequence of *Staphylococcus aureus* infection, and

that raises the question as to whether there was some other additional infection we never discovered. Our postmortem blood cultures and individual cultures from several of the abscesses, however, contained staphylococci and nothing else.

The liver showed a diffuse degenerative change of moderate intensity, the cells were swollen and vacuolated and contained bile pigment, but there was no actual necrosis of the liver cells. There were no abscesses in the liver, and nothing was found in the portal veins. We did not find the portal of entry of infection.

DR JONES: That represents really a toxic jaundice?

DR MALLORY: To what extent it was hemolytic or to what extent dependent on hepatic insufficiency is hard to say, possibly there was a combination of the two factors. The whole picture, including the nephritis, is not rare with streptococcal infection, but I cannot remember ever having seen it before with a staphylococcus.

DR RICHARD J CLARK: Is there any possibility that in a sensitive person there would be a toxic reaction of the liver or kidneys to the material which was injected to thrombose the veins?

DR MALLORY: I cannot imagine a chemical substance which would produce glomerulonephritis—a toxic nephrosis, perhaps, but never a glomerulonephritis. I think we have to assume it is on an infectious basis.

DR J H MEANS: In respect to the nephritis, it might be worth mentioning that a year or two ago we had a woman who, very shortly after an injection of quinine and urea of this sort, went into a picture of acute renal insufficiency—a very extraordinary case. She recovered after a time.

DR MALLORY: That is an interesting observation.

DR LYONS: Is there any reason to believe that the virulence tests we are doing for staphylococcus were at fault in this case?

DR MALLORY: I am forced to believe that the organism in this instance was a fully virulent one.

#### CASE 25152

#### PRESENTATION OF CASE

A forty-eight-year-old Irish housewife was admitted complaining of vomiting.

Six years before admission the patient was told that her sclerae were yellow and that she should have gall-bladder studies. She had no other symptoms and further study was not done. Two years later she complained of paroxysmal epistaxes, especially with attacks of coryza. At this time her

now well established, and it is probably a phenomenon of hypersensitivity. It is interesting that there has been apparently a lessened incidence in the United States since this was known, and also in this hospital. Is that not so, Dr Mallory?

DR. TRACY B MALLORY Very decidedly.

DR. SHORT In Denmark in the past few years since the importation of amidopyrin has been prohibited, there have been no cases.

She had plenty of granulocytes on her last admission, so I can see no connection of this illness with the cause of death. I am also unable to connect the bladder lesion with the final illness, since there was no evidence of recurrence and no urinary symptoms.

We can now turn to the fatal illness. The picture was that of jaundice with sepsis, presumably due to *Staphylococcus aureus*. Only one other possibility occurred to me. That is acute liver necrosis, perhaps precipitated by the infection and perhaps on a previously damaged liver. However, there is no past history of jaundice and no history of taking any liver poisons. The liver is said to have been small on physical examination, but we know that such measurements are notoriously inaccurate. I can see no way of ruling out this diagnosis, but I do not believe I shall make it in the face of more positive evidence. We shall admit then that the patient had a generalized, fulminating staphylococcal infection, leading to death in less than two weeks. The next questions concern the organs involved and the source of the infection. We have already stated that, in view of the jaundice, the liver was involved, probably with multiple small abscesses. The negative chest plate and the absence of cough and sputum fairly well rule out pulmonary involvement, although it would be unusual not to have abscesses in the lungs in a generalized staphylococcal infection leading to death. There were no cardiac murmurs and no other signs pointing to any other location of the abscesses.

Now as to the source, she had a sore throat which could have been a portal of entry, she also had pain in the left side of the face and over the ear, which respectively suggest sinus and middle-ear infections, both fairly common sources. However, there was no further development there and examination of the ears was negative. In reading over the history I was interested in learning of the injection treatment of the hemorrhoids three days before the onset. I shall propose that as a possible source of infection, which started in the hemorrhoidal veins, led to portal involvement and finally resulted in a suppurative pylephlebitis with a staphylococcal septicemia. Such

cases have been described as a rare complication of sepsis in and around the rectum and following operations there. The course was more rapid than would be expected in ordinary pylephlebitis following appendicitis, and the liver was not enlarged. However, I am willing to venture this as my diagnosis—a staphylococcal septicemia with a suppurative pylephlebitis and multiple abscesses of the liver from infection of the portal system starting in a hemorrhoidal vein.

DR. TRACY B MALLORY Until the positive blood cultures were reported in this case I am sure it was a good deal more of a puzzle than it is now. Perhaps Dr Jones would like to say a word.

DR. CHESTER M JONES When I first saw this patient with Dr George P Reynolds and Dr Champ Lyons, there was no doubt about the intensity of the jaundice and we had a record, if I remember correctly, of one throat culture which was positive for staphylococci but not for streptococci. It was a question of whether there was any significance at all in the throat culture at that time. Throughout the patient's entire stay in the hospital it was impossible to demonstrate accurately the size of the liver. It seemed to me, however, that the liver was definitely small. Dr Short is right in stating that it is dangerous to say the liver is large or small, but there was moderate distention and the lower border of dullness was well above the costal margin. At the time it seemed as if there was acute hepatic insufficiency, and we had to treat it as such until we obtained more evidence. I believe that there was acute hepatic damage, cause unknown. At no time was it possible for me to think that the liver was enlarged, which is interesting in view of the post mortem findings. Several of us tried to outline the liver as carefully as we could.

Another point, which I think is of some interest, was the sustained high temperature. With acute yellow atrophy at times there is fever, but it is not as sustained or as high as this was. I am surprised it was not a picket-fence temperature.

DR. CHAMP LYONS I was asked for an opinion as to the advisability of sulfanilamide therapy in this patient. There was no positive cultural diagnosis of hemolytic streptococcus, and I withheld sulfanilamide until such time as the culture was returned. The throat culture contained a large number of staphylococci, but these were coagulase negative when tested in human plasma. Those of us who are working with the staphylococci have come to attach a good deal of significance to the coagulase test as a test of virulence. The blood culture was positive for staphylococcus only.

disagree with what appears in the text—a high diaphragm with some compression of the lungs and not a large heart but one that is displaced by the diaphragm. There is tortuosity of the aorta which may be due to the high position of the heart. The shadow of the liver seems small. However, when the abdomen is full of fluid the liver floats up, you may get it in a different plane and in that way it seems small. I should think the only thing you could be certain about is that she had fluid in the abdomen.

DR. STEWART: Have you any comment to make about the displacement of the stomach to the right?

DR. HOLMES: If it was displaced to the right it would suggest that the liver was small or that there was an enlarged spleen on the other side pushing it over. However, I should not be at all certain that it was displaced.

DR. STEWART: Do any medical men want to comment on these electrocardiographic findings?

DR. WILLIAM B. BREED: They do not mean anything.

DR. STEWART: In this case I have been puzzled as to how to put the various findings together in one plausible diagnosis. There are a number of leads in the first part of the history that do not seem to be borne out subsequently. She had had hypertension, 240 systolic, in the past, while her blood pressure was 138 systolic, 75 diastolic, in the hospital. What was formerly taken to be enlarged thyroid gland was not noted in physical examination here, and there is no note as to enlargement or increase in density of the thyroid mass. Furthermore, glycosuria had been noted in the past, while the urine seemed to be free of sugar at every examination in the hospital. None of these apparent leads develop far enough to point anywhere in particular. The major problem seems to involve the explanation of the extensive edema and ascites with coincident obstructive jaundice. It is worth noting in passing that the physical signs in this case are rather like those we see in constrictive pericarditis, that is, she was said to have distention of the neck veins although in what portion we do not know. She had extensive ascites and apparently enlargement of the liver. There was hydrothorax without any significant amount of edema of the lungs, and that probably is an important point in discussing the diagnostic possibilities. Furthermore, but few abnormalities were noted in the examination of the heart, which is often true in cases of constrictive pericarditis. However, there are certainly not enough data to make that diagnosis here. She had a rather small pulse pressure. We have no information as to lim-

itation of extent of cardiac pulsation as determined by fluoroscopic examination. It is interesting that she apparently had dyspnea on exertion without orthopnea—that is frequently true in cases of constrictive pericarditis.

It seems to me that primary nephritis can be excluded as a cause for the extensive edema and ascites in this case. To be sure, there was some albumin in the urine, but there is no record of any cytological findings in the urine and the concentrating power was good. The question of whether the change from a hypertensive state to a condition of fairly normal range of blood pressure is significant in the present illness I cannot settle. In view of the electrocardiographic findings and physical examination I am inclined to think that she did not have any primary cardiac disease which might lead to the extensive edema and ascites. We come to considering the sudden development or intensification of the ascites. According to the story the edema of the extremities developed some months before the patient noted enlargement of the abdomen. Of course that is not necessarily accurate information, in that she may have developed and not noticed ascites during the same period of time. However, it does appear to be definite that two weeks before admission there was a rapid enlargement of the abdomen.

I do not believe that primary peritonitis or carcinomatosis of the peritoneum could give this picture. The fluid withdrawn amounted to 6000 cc and had all the characteristics of a transudate. There was no blood in it. No tumor cells were found, which means very little so far as making a diagnosis of widespread carcinoma of the peritoneum is concerned. We come then to consideration of the possibility of cirrhosis. There is a story going back over six years during which time the patient had recurring bouts of mild jaundice, with impairment of her general health. The jaundice apparently was not obstructive, and was of mild degree. Certainly bile was coming through into the gastrointestinal tract. The question of whether she had cirrhosis on the basis of chronic and intermittent obstruction of the common duct, as from stone, has to be considered. It seems to me there is not very much on which to make a diagnosis of biliary cirrhosis in this case. There was little if any abdominal pain with the attacks of jaundice, and apparently little or no fever, certainly no definite chill. If she had biliary cirrhosis with stone one might suppose that the picture was changing with the development of carcinoma of the gall bladder and obstruction to the portal vein. However, I think that is not a very likely diagnosis. Could she have had cirrhosis of the liver of the toxic

blood pressure was found to be 240 systolic. There was a swelling in her neck said to be the thyroid gland. Three years before entry she noticed weakness in the knees while walking, and she restricted her activities. She had slight swelling of the ankles, relieved by rest. One year before admission she was told that she had sugar in her urine and was given pills. Since she was eating very little a diet was not prescribed. She had had intermittent episodes of yellow sclerae since the onset, there had been no pain. Seven months prior to entry she noted soreness of the ribs on both sides on rising from bed, and a numb feeling from the waist to the knees, which in several days extended to her legs and feet. She also began to have nausea, and vomited yellow bitter fluid and food eaten the night before. Her urine became dark but soon returned to normal color. The swelling of her ankles increased and two months later reached the point where she could not put on her shoes. Four months before entry she was put on a diet restricted to fruits and fluids. She could not take cream because it precipitated vomiting. She began to lose weight, and had lost 35 pounds during the seven months before admission. Two months later she noticed dyspnea on exertion, but no orthopnea. Her skin became slightly yellow. From this time on she remained in bed. Two weeks before entry her abdomen began to swell rapidly. The urine became very dark, the stools were gray and her jaundice deepened, though it faded slightly during the week preceding entry.

There had been no pregnancies. During the previous six years her catamenia had been irregular and had ceased eight months before admission, this being followed by severe hot flashes. She repeatedly and emphatically denied the use of alcoholic beverages.

Physical examination showed a well-developed, undernourished woman with rapid shallow respirations. The skin was sallow and slightly icteric, the sclerae decidedly icteric. There was pitting edema below the costal margin. The neck veins were dilated, but there was no cyanosis. Examination of the chest revealed some elevation of the diaphragm and a few fine rales over the right base. The heart was negative. The blood pressure was 138 systolic, 75 diastolic. The abdomen was tense, with small dilated veins over both sides. By percussion the upper border of liver dullness was at the fourth rib, the lower border 5 cm below the right costal margin. Palpation was practically impossible. Pelvic and rectal examinations were both negative. There was pitting edema of both legs, and deep tenderness

over the lumbar spine. There were no definite neurological findings.

The temperature was 100°F, the pulse 95, and the respirations 22.

Examination of the urine showed a specific gravity of 1.034, a very slight trace of albumin and a trace of bile. The blood showed a red-cell count of 2,670,000 with 80 per cent hemoglobin, and a white-cell count of 22,100 with 83 per cent polymorphonuclears. The blood smear showed no abnormal cells. The serum nonprotein nitrogen was 29 mg per 100 cc, the protein 6.2 gm, and the van den Bergh 10.80 mg., diphasic. A blood Hinton test was negative. The stools were brown, and repeated examinations were guaiac negative. A Takata-Ara test was positive.

X-ray films of the chest showed a high diaphragm with a small amount of fluid in both pleural cavities. The heart was in transverse position and possibly slightly enlarged. The aorta was tortuous. A flat abdominal film showed the psoas shadows poorly outlined. There was no evidence of enlargement of the liver, rather it seemed smaller than normal. The spleen was not visible. The bones showed no abnormality. A gastrointestinal series showed the stomach displaced to the right. There were no varices. The remainder of the gastrointestinal tract was normal.

On the second hospital day an abdominal paracentesis yielded 6000 cc. of clear yellow fluid, with a specific gravity of 1.010 and 150 cells per cubic millimeter. No tumor cells were seen. After removal of the fluid a mass was palpable in the mid-epigastrium, which by one observer was thought to be rough and nodular, by another smooth. It extended about a handbreadth below the xiphoid process and was thought to be the left lobe of the liver. An electrocardiogram on the second day showed a low T<sub>1</sub>, a diphasic T<sub>2</sub>, and an inverted T<sub>3</sub>. The P-R interval was 0.13 seconds, and the rhythm normal. On the ninth hospital day the patient was given Salyrgan. The following day there was considerable vomiting, she became quite dehydrated, and the temperature rose to 103°F, rectally. Two days later the serum nonprotein nitrogen was 53 mg per 100 cc, the chlorides 98.6 milliequivalents. The temperature was 103.5°F. Her pulse had risen to 176, the respirations to 35. She rapidly failed and died the following day, twelve days after admission.

#### DIFFERENTIAL DIAGNOSIS

DR JOHN D STEWART May we see the x-rays?

DR GEORGE W HOLMES The high position of the diaphragm makes any interpretation of the chest difficult, but I do not see any reason to



disagree with what appears in the text—a high diaphragm with some compression of the lungs and not a large heart but one that is displaced by the diaphragm. There is tortuosity of the aorta which may be due to the high position of the heart. The shadow of the liver seems small. However, when the abdomen is full of fluid the liver floats up, you may get it in a different plane and in that way it seems small. I should think the only thing you could be certain about is that she had fluid in the abdomen.

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type, or so-called portal cirrhosis? It seems to me that that is a possibility. It would explain the digestive disturbances and the mild jaundice which she had had from time to time. It might lead to what we take to be an enlarged liver, and it might give her the ascites and even the peripheral edema. However, there are a number of things lacking to make it a highly plausible diagnosis. We have no evidence of the development of collateral circulation, although there is a note of small dilated veins on the lateral abdominal wall. She had no esophageal varices, and her stools were guaiac negative. If she had portal cirrhosis, what produced the sudden change in the picture? It is a rather far cry, but I do not see why, having cirrhosis, she might not have developed secondarily a carcinoma which produced pressure on the portal vein and rapidly progressing ascites.

Could she have been having recurring mild bouts of hepatitis with subsequent development of acute yellow atrophy? That does not seem to me to be the most plausible diagnosis. Apparently she had some obstruction to the flow of bile, for immediately before entry the stools were clay colored. That probably is an important point, if the observation is correct.

I can do no better than say that I believe this woman had cirrhosis of the liver and that she probably had carcinoma in addition, perhaps developing in the liver as a primary lesion.

DR. J. H. MEANS: I was in charge of the service when this patient was on it, and there were several differences of opinion about the diagnosis. Two of these concerned the size of the liver and its consistence. The x-ray people told us that the liver seemed to be rather small, and yet we thought that we felt it and that it was definitely enlarged. The senior house officer was absolutely certain that the liver was grossly irregular and contained hard nodules and that therefore she had some form of malignant disease in the liver. I personally thought the liver was smooth, so we asked Dr. Benedict to have a look at it to settle this point, if he could, but his examination was postponed for some unavoidable reason, and by the time he could do it she had developed fever and was too sick. She died, I am sure, of a terminal infection, but I think she had cirrhosis of the liver with hepatic insufficiency. But as I said, the senior house officer thought she had malignant disease in the liver, and the junior signed the case off, because of that opinion, as one of metastatic carcinoma of the liver, possibly from the pancreas, with a questionable diagnosis of hepatoma.

Among other diagnoses that Dr. Stewart has mentioned, I think it is interesting to note that

the house officer who made the admission summary included the possibility of cirrhosis, with acute hepatitis. I should like to have that diagnosis of Dr. Hawes made a matter of record.

There are two points brought up by Dr. Stewart on which I might comment. We found no evidence of Graves's disease. In regard to glycosuria, hemachromatosis was considered, but she had no glycosuria in the hospital except after receiving intravenous glucose.

DR. CHESTER M. JONES: It seems to me that jaundice of six years' duration must be included as part of the picture, and I should agree with Dr. Stewart and Dr. Means that she must have had chronic intrahepatic disease that could be labeled cirrhosis. That is not enough to explain her death and terminal picture. I am in favor of superimposed cancer.

DR. TRACY B. MALLORY: Do you think in these cirrhotic cases we are missing information by not fractionating the serum protein? One can have a normal total protein level but nevertheless an albumin so low that ascites and edema may develop without mechanical obstruction.

DR. JONES: On the wards I see very few cases of cirrhosis with ascites which do not have an inverted albumin-globulin ratio, although some have normal serum protein values. No doubt we should fractionate the protein. Another thing that might have given some confirmatory evidence is a dye test. If she had shown abnormal dye retention we should have had more evidence of diffuse liver involvement.

DR. MEANS: There was a positive Takata Ara test.

DR. JONES: As a rule that is not so significant as the dye test.

#### CLINICAL DIAGNOSES

Metastatic carcinoma of liver, probably from pancreas  
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#### DR. STEWART'S DIAGNOSES

Portal cirrhosis of liver  
Hepatoma

#### ANATOMICAL DIAGNOSES

Acute alcoholic cirrhosis of the liver  
Septicemia, *Streptococcus hemolyticus*  
Ascites  
Icterus  
Arteriosclerosis

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: The autopsy showed an enlarged, absolutely smooth liver. The spleen was small,

weighing only 100 gm, so I do not think there could have been a significant degree of portal obstruction. We have to fall back on the possibility of a very low serum albumin as an explanation of the ascites and edema. The liver, although smooth, was firm and very tough when one attempted to section it. On microscopic examination it is slightly but diffusely cirrhotic, with a very marked degree of fatty vacuolization and also in one cell out of every ten the characteristic hyaline degeneration that one sees in acute alcoholic injury to the liver. Subsequent to the autopsy we received some confirmatory evidence of that. A medical student who had known the patient gave us the information that she was a notorious alcoholic. In this city, I think it is fair to say that acute alcoholism is the commonest cause of fulminating acute liver insufficiency. We see very few cases here but they see a considerable number at the Boston City Hospital at all times.

DR. JONES: Mostly gin?

DR. MALLORY: Mostly alcohol purchased in drugstores and diluted to variable extents, it at all. This is, I believe, the only state in the country in which it is possible to buy straight alcohol without prescription at the drugstores.

DR. MEANS: As I recall, you did not think there was much cirrhosis at the time you did the autopsy.

DR. MALLORY: At the time I showed you the organ I had not yet attempted to cut it. It was

definitely cirrhotic but not granular. It was characteristic of the early stage of alcoholic cirrhosis.

DR. STEWART: Was there very much fluid in the pleural cavity?

DR. MALLORY: None.

DR. JONES: It seems to me one point might be mentioned which involves a fair number of cases that we see here. A good many of our cases of hepatic insufficiency in acute as well as chronic alcoholism do have really big livers. In other words we are recognizing them earlier than we used to, and we see the intermediate stage before they develop small livers. These are the patients that do best if you catch them in time and eliminate the alcohol.

DR. HOLMES: Did she have any tortuosity of the aorta?

DR. MALLORY: Her heart weighed 350 gm, which was evidence of very slight hypertrophy, and the aorta showed only very slight atheromatous changes.

DR. MEANS: She had a terminal streptococcal septicemia?

DR. MALLORY: Yes, although she had enough severe and acute liver damage to have died primarily of the liver insufficiency.

DR. MEANS: As I recall, she was running only slight fever for several days, and we were not aware of the urgency of the situation until she developed a high fever and died.

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Slight though this tendency may be, there have been enough distinguished examples in the past to make one hesitate to place the least check on such a beneficent interchange of teachers. If citizenship is required for the ordinary practitioner, due provision in the law should be made for the teacher.

Whatever may be the motive behind this particular bill, there is distinct merit in the idea that the physician should be identified politically, as well as professionally and socially, with the community which he serves, and that whatever form the expression of his loyalty may take it should have the broadest basis possible. Will a law accomplish anything in this direction? The sometimes startling ineffectiveness of the statutes in assisting us to control our emotional reactions should also be noted in this connection.

#### THE CARE OF MENTAL DISEASE IN MASSACHUSETTS

THERE has recently been issued the report of the Special Commission on Mental Diseases based on a year's study of the state institutions and the organization of the Massachusetts Department of Mental Health. The report, on the whole, is excellent, and of particular value is the survey made by Dr Samuel W. Hamilton, of New York, on mental institutions in Massachusetts. Such an impartial survey has long been needed, and it is with gratification that one notes how relatively little there was to criticize about the care of the mentally ill in this state. Dr Hamilton called attention to the fine medical organization which was handling the problem sympathetically and intelligently and doing a vast amount of service to the Commonwealth. In his opinion the present structure of the department as set up in 1958 should be given a thorough trial. He pointed out, nevertheless, that the most effective organization is one headed not by a commissioner with associate commissioners but by a council on mental health, the councilors being persons expert in various fields related to the work of the department. This was his general recommendation, although he suggested a good many relatively minor

changes which would improve the system as a whole. His report should be given the most careful consideration by the Legislature.

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## SHOULD PHYSICIANS BE CITIZENS?

THIS question has been asked frequently of late when, sometimes in dramatic fashion, the desire and need of refugees to pursue their lifelong vocation in this the country of their refuge have become known. It is not a new problem, as the statutes of several states show. In those commonwealths no alien can be registered for the practice of medicine. But there is a larger problem, involving not aliens in the political sense, but native-born persons who shirk the responsibility of citizenship. They are called citizens, but too many physicians absorbed in the practice of medicine—and it is indeed an absorbing vocation—have turned a deaf ear to the calls on their time and strength which the highest welfare of the state demands. They scorn "politics" as unworthy, if not of an

honest man, at least of a member of the medical profession. But at one time when the state was circumscribed within the confines of the city, politics had to do with the welfare of the state. To the Greek, who gave us the word "politics," the man who failed in his duty to the state was no citizen.

The lawyer must be a citizen for he is an officer of the court of law which is a part of the government, and the moral responsibility of the physician is no less than that of the lawyer. By the very nature of his work he enters, more deeply perhaps than the member of any other profession, into the life of his community, and consciously or unconsciously molds it, for good or for ill, far beyond his influence in ministering to purely physical needs. Should not everyone who holds such power be politically sympathetic with those fundamental ideas for which representative government stands?

Even if one is at first convinced by this line of argument several questions arise, and the first one that is asked about such legislation as is proposed in House Bill 1407, now before the Committee on Public Health of the Legislature, is, What harm results under the present law? Obvious harm there may not be, but in these days of rampant and often unwise, if not insane, nationalism, it is well to remember that there is such a thing as wise nationalism, without which no wise internationalism or world peace is possible. The practical question is whether the requirement of citizenship for every physician will enhance his sense of proper loyalty to the fundamental political ideals of this country.

It is to be kept in mind also that the physician is not an itinerant and that in general the more fully he identifies himself with the community in which he lives, the greater is his loyalty and the better he serves the community. But there is a possible disadvantage. While the physician is not itinerant, the teacher may be, and with the development of medical education in connection with universities, there has been a tendency to develop visiting and exchange professorships, and sometimes a foreigner is called to a teaching position.

Slight though this tendency may be, there have been enough distinguished examples in the past to make one hesitate to place the least check on such a beneficent interchange of teachers. If citizenship is required for the ordinary practitioner, due provision in the law should be made for the teacher.

Whatever may be the motive behind this particular bill, there is distinct merit in the idea that the physician should be identified politically, as well as professionally and socially, with the community which he serves, and that whatever form the expression of his loyalty may take it should have the broadest basis possible. Will a law accomplish anything in this direction? The sometimes startling ineffectiveness of the statutes in assisting us to control our emotional reactions should also be noted in this connection.

#### THE CARE OF MENTAL DISEASE IN MASSACHUSETTS

THERE has recently been issued the report of the Special Commission on Mental Diseases based on a year's study of the state institutions and the organization of the Massachusetts Department of Mental Health. The report, on the whole, is excellent, and of particular value is the survey made by Dr Samuel W Hamilton, of New York, on mental institutions in Massachusetts. Such an impartial survey has long been needed, and it is with gratification that one notes how relatively little there was to criticize about the care of the mentally ill in this state. Dr Hamilton called attention to the fine medical organization which was handling the problem sympathetically and intelligently and doing a vast amount of service to the Commonwealth. In his opinion the present structure of the department as set up in 1938 should be given a thorough trial. He pointed out, nevertheless, that the most effective organization is one headed not by a commissioner with associate commissioners but by a council on mental health, the councilors being persons expert in various fields related to the work of the department. This was his general recommendation, although he suggested a good many relatively minor

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mental hospitals to spend at least a few months' time at the Boston Psychopathic Hospital every few years. There they would be inculcated with a spirit of research, which should serve a very useful purpose when they return to their individual state units. As a corollary to this, research should be more fostered in the state hospitals, and better laboratories and libraries provided. The state of the psychiatric libraries for professional use in our state institutions for mental disease is, in most cases, appalling. A few hundred old books and one or two journals are all that is available for the younger men, who most need the stimulus of constant reading. It is believed, therefore, that the Boston Psychopathic Hospital should be maintained as a unit in an expanded form.

The second problem, in regard to the care of the criminally insane in Massachusetts, is one that really needs little comment. For a number of years everyone adequately informed on the subject has recommended a special hospital for this group of patients, to be constructed on state land, presumably at Norfolk. This would replace the state hospital department at Bridgewater State Farm, where the care of the criminally insane is almost necessarily custodial and not medical.

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### POSTPARTUM HEMORRHAGE

Miss N., a twenty-one-year-old gravida I, entered the hospital on June 2, 1938, to await confinement. At this time she was approximately thirty-eight weeks pregnant.

The family history was irrelevant. The patient had had the usual childhood diseases but no serious operations. Catamenia began at thirteen, were regular with a twenty-eight-day cycle, and lasted four days without pain. Her last period was September 10, 1937, making her due for delivery June 17.

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

Examination on admission disclosed a small, fairly well-developed and nourished young woman. Her entire physical examination was negative. The lungs were clear and resonant, the heart was not enlarged, and there were no murmurs. The fundus lay two fingerbreadths below the umbilical cartilage, the head was presenting and floating. The fetal heart was heard best in the right lower quadrant and had a rate of 137. Pelvic measurements were as follows: interspinous, 21.5 cm, intercrural, 25 cm, external conjugate, 19 cm. Urinalysis was negative, the blood Wassermann test and urethral and cervical smears were negative. Her prenatal course was normal, the blood pressure had never gone above 110 systolic, 70 diastolic, and she had had no toxic signs or symptoms.

Labor started at 10:45 p.m. on June 23 and in fifteen and a quarter hours the patient was fully dilated. There was no further progress in the next two hours and a half, and because of this, forceps delivery was entertained. The head was well in the pelvis and was in a partially rotated ODP position. A forceps was applied, and the baby delivered at 4:55 p.m. on June 24. The placenta and membranes were expressed intact, but the uterus failed to maintain good contraction and a very brisk hemorrhage occurred. An ampule of posterior pituitary extract was administered. The pulse rose precipitously to 160 per minute, its quality was thready and weak, and the patient was clammy and perspired freely. A second ampule of pituitary extract was administered, and the fundus judiciously massaged. Two ampules of ergot were then given, this was followed by a cessation of hemorrhage. Immediately after delivery an intravenous clysis of 700 cc. of 5 per cent glucose in saline solution had been administered. The patient was placed in Trendelenburg position, heat was applied by means of blankets, and a firm abdominal binder was placed over the lower abdomen. Four hours post partum the patient's pulse had dropped to 100 per minute, and her condition improved rapidly thereafter. On her return to bed she was given 1/6 gr. of morphine and a clysis of 500 cc. of 5 per cent glucose in saline solution. A course of Ergotone was given on the second postpartum day. The fundus remained well contracted, the flow was normal, and the patient was discharged on the fourteenth day after delivery. The blood hemoglobin on discharge was 68 per cent.

*Comment.* This case illustrates the commonest cause of moderate postpartum hemorrhage due to uterine inertia. As is so often the case, oxytocics will initiate uterine contraction without the need



of intrauterine exploration There is no mention made of blood grouping and matching, which should be a routine procedure Fortunately, this patient's condition improved without transfusion There is no evidence in the history of the case that in any way shows that this moderate hemorrhage could have been prevented, however, there is no record that the fundus was held any length of time after the initial bleeding Presumably, however, it was held until the periods of contraction were far longer than those of relaxation The use of a firm abdominal binder, as mentioned in this case, surely has no value in preventing relaxation of the uterus

### SPECIAL MEETING OF THE COUNCIL

A special meeting of the Council of the Massachusetts Medical Society will be held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, April 26, at 10:00 a m

#### BUSINESS

Consideration of the report of the Committee on Public Relations on social legislation and insurance.

This will be an important meeting and full attendance is desired

ALEXANDER S BEGG, *Secretary*

Councilors are asked to sign one of the two attendance books before the meeting The Cotting Luncheon will be served immediately after the meeting

### LEGISLATIVE NOTE

The chiropractic bill, now before the Committee on Public Health, has been given a number, House Bill 2151

The people who favor this bill have been particularly active this year, and we strongly urge each member of the Society to write to his senator, his representative and members of the Committee on Public Health asking them to oppose it The hearing will be held at 10.30 a m., April 25, in the Gardner Auditorium Please come and bring your friends!

CHARLES C LUND, *Chairman*  
Committee on State and  
National Legislation

### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 17

#### BARNSTABLE

Sunday, April 23, at 4 00 p m., at the Cape Cod Hospital, Hyannis. Subject—Bright's Disease and Hypertension Evaluation of new therapy diagnosis. Instructor Robert S Palmer Donald E Higgins, *Chairman*

#### BERKSHIRE

Thursday, April 20, at 4.30 p m., at the House of Mercy Hospital, Pittsfield. Subject—The Indications and Contraindications for Removal of Tonsils and Adenoids. Instructor James M Baty Melvin H Walker, Jr, *Chairman*

#### FRANKLIN

The course will be omitted on April 19 because of the holiday

#### HAMPDEN

Thursday, April 20, at 4 00 p m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 p m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Subject—The Control and Treatment of Respiratory Infections. (This is to include the serological treatment of pneumonia in infants and children) Instructor Charles F McKhann George L. Schadt, *Chairman*

#### MIDDLESEX SOUTH

Tuesday, April 18, at 4 30 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge Subject—Gonorrhea Modern treatment of gonorrhea Instructor Fletcher H Colby Alexander A Levi, *Chairman*

#### SUFFOLK

Thursday, April 20, at 4 30 p m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston Subject—Whooping Cough Diagnosis and treatment. Instructor Warren R Sisson Reginald Fitz, *Chairman*

### DEATHS

LITCHFIELD—WILLIAM H. LITCHFIELD, M.D., of Marblehead, died April 2 He was in his eighty fifth year Dr Litchfield received his degree from Harvard Medical School in 1882. He was a member of the Massachusetts Medical Society and the American Medical Association

WALKER—LEWIS M WALKER, M.D., formerly of Cambridge, died in St Augustine, Florida, April 4 He was in his seventy third year

Dr Walker received his degree from Harvard Medical School in 1891 He was a fellow of the Massachusetts Medical Society and the American Medical Association and held memberships in the American Psychiatric Association and the New England Society of Psychiatry His widow survives him

### INFANTILE ECZEMA\*

Eczema is one of the common ailments of infancy While it may be sometimes caused by fungous infection, similar to that which causes athlete's foot, or by ordinary external irritation of many sorts, by far the commonest cause is

A Green Lights to Health broadcast given by Dr Lewis Webb Hall on Wednesday January 25 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health

what is called allergic sensitization to foods or, more rarely, to substances in the environment, such as feathers, house dust, wool or various other animal hairs. Different persons are sensitive to different kinds of foods or substances—sometimes to only one or two, sometimes to many. I shall confine my discussion to this type of eczema.

By an allergic person is meant one who has an abnormal sensitivity to substances either in the diet or surroundings, which do no harm to most persons. These substances are called allergens. Allergic sensitization is usually shown by eczema, asthma or hay fever, when the individual is exposed to the allergens to which he is sensitive. It is not well understood why some people react in this abnormal way to things which are harmless for most people. One can say only that they have a certain type of constitution, and that this constitution is often hereditarily transmitted, for it is common to find families in which eczema, asthma or hay fever is unusually prevalent.

Infantile eczema usually starts at about the third or fourth month, on the cheeks, scalp and forehead. It may then spread to other parts of the body, particularly the neck, arms and the outer parts of the lower legs. Sometimes in severe cases the entire skin surface may be affected. Many infants with eczema recover of themselves during the second year, in others the eruption may become chronic, and may last all through childhood, even well into adult life. Many infants who have had eczema later develop asthma or hay fever.

The treatment of infantile eczema is not easy, either for the mother or doctor and all treatment must be carried out in the most detailed manner. While understanding of this disorder has increased a great deal in the last twenty years, it is in reality a most complicated condition, and there are many aspects of it about which but little is known.

The first step in the investigation of any case of allergic eczema is to determine the allergens to which the infant is sensitive. This is done by making many small scratches on the back, and applying to each scratch, extracts of various foods and environmental allergens to which the infant may have been exposed. Sensitivity to an allergen is indicated by a raised red blotch, something like a large mosquito bite, appearing in about fifteen minutes on the particular scratch to which the allergen in question has been applied. These tests have helped a great deal in the study of the allergic diseases, but they are by no means entirely reliable, for sometimes a patient will fail to give a positive skin test to an allergen to which he is really sensitive, or he may give a positive test to one to which he is not sensitive and which has nothing to do with the cause of his eczema. A positive skin test indicates, therefore, only a possible, not a certain, causative factor.

An eczematous infant is tested with all the foods he is eating, and with a number of the common environmental allergens, such as wool, feathers, house dust and silk. Let us consider for a moment the foods which most infants eat at the age of six months, and their relative importance in the causation of allergic eczema. Most infants at this age are eating cow's milk, wheat cereal, various vegetables, sometimes egg yolk, cod liver oil and orange juice. Positive skin tests are most frequently obtained to egg, milk and wheat. The frequency of positive tests to egg at first glance seems strange, for most of these babies were not eating it when the eczema began, and many of them have never eaten it at any time. Furthermore, the sensitization to egg is usually a very violent one, and many of the egg sensitive babies will be made severely ill if they eat it, and may immediately break out with hives all over the body. There has been much discussion

about why there is this sensitivity to egg in young infants who have never eaten it. The most commonly accepted theory is that they were sensitized to it before they were born by egg eaten by the mother during her pregnancy. So while egg sensitivity is very common in these babies, and may be of high degree, it is not often the cause of the eczema unless the baby is eating egg, which he usually is not.

The situation is very different for milk, as the baby is daily taking large amounts of it. Indeed it has seemed to me that sensitization to cow's milk is the commonest single cause of allergic eczema in infancy. Wheat sensitivity is likewise common, and about doubles in incidence after the fifth or sixth month, when most babies begin to take cereal. Sensitivity to peas or spinach is not uncommon. Positive skin tests to orange are not common, but the mother often notices that the baby begins to itch, or that his skin becomes redder, soon after taking orange juice, so that it may be of more importance than is indicated by the skin tests. Sensitivity to fish oil is not common, but may occasionally exist and, when it does, may be of high degree.

There have been many different diets recommended in the treatment of infantile eczema, which have had a brief period of popularity and have then been discarded. At the present time most of those who have made a study of the subject believe that the discovery of the food or foods to which the infant is sensitized, and removal of these from the diet, is the best method of dietetic treatment now available. Such treatment does not always prove successful, however. Furthermore, it must not be forgotten that many causes of infantile eczema have nothing to do with diet, and may come from outside causes. Mothers and many doctors have been too ready to believe that any and all forms of skin eruption in infants are of food origin, but this is not so.

It must be remembered that the patients we are dealing with have a particular type of constitution. The skin symptoms may often be helped by removal of sensitizing foods from the diet, but the type of constitution is not changed, the patient still has his abnormal capacity for becoming sensitized to other foods or environmental allergens, substances such as dust and feathers, as he becomes older, and may develop asthma or hay fever in childhood, even if his eczema in infancy has been cured by the removal of the special offending foods.

In planning a diet for eczematous children it is necessary to bear in mind that it must be an adequate one, no matter what the skin tests show—the whole child is more important than his skin. There is usually little difficulty, however. There are many cereals and vegetables from which to choose if sensitivity exists to one of the group, and if there is sensitivity to orange or tomato juice, vitamin C in tablets, in the form of cevitamic acid, can easily be substituted. Milk offers the greatest difficulty. In cases with milk sensitivity there are three methods of feeding that may be used.

(1) Evaporated cow's milk may be tolerated. In the process of evaporating milk it is heated very hot, which to a certain extent changes the albuminous portion of the milk, so that it may sometimes be taken by milk sensitive infants when fresh milk cannot. It is the best form of milk to use in infantile eczema if cow's milk is to be used at all, but is in my experience not so efficient in eczema as it sometimes is in other forms of milk sensitivity, and I have not seen many milk sensitive eczematous infants cured by the use of evaporated cow's milk.

(2) Goat's milk is somewhat better, and occasionally brilliant results are secured by its use. The trouble is, however, that many eczematous babies are sensitized to goat's milk as well as to cow's milk, and in these it does no good.

(3) Better results are likely to be obtained by the use of a milk-free food, of which there are several on the market. Most of these are made with soy-bean flour as a base, and many babies will grow and gain weight on these foods as well as they do on milk. These foods have the disadvantage, however, that they sometimes cause loose, very bulky bowel movements and irritated buttocks, and they should not be used for undernourished babies, for in such babies if severe diarrhea results it may be more serious than the original eczema. With these exceptions, such foods may be said to have proved very useful in dealing with milk-sensitive babies.

If the baby is sensitized to environmental allergens, it is necessary to avoid them. Many eczematous babies give positive skin tests to feathers and house dust, although it is by no means always or indeed often possible to prove that such sensitization is the cause of the eczema. It is well, however, to allow no eczematous baby to sleep on a feather pillow, and to keep his room as bare and as free from dust as possible. Wool is another potent source of trouble. Although there may sometimes be allergic sensitization to wool, it has seemed to me that it is more often irritating on account of its natural irritating quality—rubbing on wool will almost always make the eczema worse.

Determination of the allergens to which an infant is sensitized and removal of them are important but only a part of the treatment. Careful nursing and skilled local treatment are of equal importance. In young infants a large proportion of the inflammation that one sees on the skin is caused by scratching and rubbing. It is therefore necessary to restrain them in order to prevent this. The two best methods have been, in my experience, the use of heavy cardboard tubular splints over the elbows, so that they cannot be bent, and the tying of the wrists and ankles to the sides of the crib with soft tape. Itching is very difficult to control, and as a matter of fact I doubt if there is any local application that really stops it. A small amount of carbolic acid added to any lotion or salve that is being used will help somewhat, but often a quieting medicine at night may be necessary to secure sleep. The only really efficient way to control itching is to cure the eczema.

It has been said that no water should be used on the skin of an eczematous baby. This may be so for very acute cases, but it hardly holds true for all cases, and there is usually no objection to washing with water the buttocks, groins or any other parts that are dirty. I am not much in favor of oil baths for acute cases. They sometimes do more harm than good.

There have been innumerable salves and lotions used in the treatment of infantile eczema, and the particular stage in which the eczema happens to be calls for much judgment in selecting an appropriate local application. Furthermore, what is good for one baby may be bad for another. It may be said, however, that tar ointment, prepared with crude coal tar is often very efficacious, and that simple boracic acid ointment is always safe and sometimes works surprisingly well, particularly if the parts on which it is used can be bandaged and thus kept free from outside irritation. If the eczema is of the weeping oozy type, ointments and thick lotions should not be used. This

stage is best treated by applications of a solution of boracic acid, or by a weak solution of several other substances which your doctor can provide. In not a few cases too strong or unsuitable local remedies make an existing eruption worse, and it is well to be guided by your doctor rather than by well meaning friends or the patent medicine counter.

Finally, most cases of infantile eczema are not cured quickly. To get the better of this disorder involves much time and patience and most careful nursing.

## MISCELLANY

### CHRONIC NONTUBERCULOUS INFECTIONS OF THE LUNG

Bitter experience has taught many a practitioner to keep tuberculosis always in mind. Cough, expectoration, fatigue and other indefinite symptoms rouse in him the suspicion that tuberculosis may be the cause. Such an attitude is good, but it should be balanced by the realization that there are many conditions strongly suggestive of tuberculosis which are nontuberculous. At the thirty-fourth annual meeting of the National Tuberculosis Association there was presented a symposium on "Chronic Nontuberculous Infections of the Lung." Abstracts from one of the papers, based on experiences by Dr. Robert G. Block and Dr. Byron F. Francis (Am. Rev. Tuberc. 38: 651-662, 1938) in the Department of Medicine, University of Chicago, are here presented.

Bronchiectasis and abscess are the most important non-specific pulmonary infections, especially from the standpoint of public health. A study of the clinical material accumulated over a period of ten years results in a number of etiologic and clinical observations. Roentgenological examination is a minor aid in recognizing nontuberculous infections of the lung (though necessary in diagnosing their exact distribution and extent) because the anamnesis together with physical examination leads so securely to a diagnosis.

#### BRONCHIECTASIS

Of 200 patients records with the diagnosis "bronchiectasis" admitted to the institution in a ten year period, 140 were rejected for various reasons—that is, bronchiectasis was diagnosed as a minor condition of little significance, it was merely registered as an impression, the bronchiectasis was a development secondary to tuberculosis. The remaining 60 patients include only those in whom moderate or pronounced symptoms of bronchiectasis were the sole reason for the patients having sought medical aid, in whom the presence of the condition was known and in whom a reasonable effort had been made to find extra-pulmonary etiology. Almost all had an advanced degree of bronchial dilatation.

The ages of these 60 cases ranged from ten to sixty-seven, the average age being about twenty-nine years. The estimated average age at the beginning of symptoms was about fourteen years and the average duration of chronic symptoms about fifteen years.

Primary, or predisposing conditions and the secondary or immediate cause, are recognized. The primary condition consists largely of the array of infectious diseases of the upper respiratory tract. Among the secondary causes, involvement of the nasal sinuses, chiefly the maxillary ones, plays the dominant role in the origin of bronchiec-

what is called allergic sensitization to foods or, more rarely, to substances in the environment, such as feathers, house dust, wool or various other animal hairs. Different persons are sensitive to different kinds of foods or substances—sometimes to only one or two, sometimes to many. I shall confine my discussion to this type of eczema.

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Infantile eczema usually starts at about the third or fourth month, on the cheeks, scalp and forehead. It may then spread to other parts of the body, particularly the neck, arms and the outer parts of the lower legs. Sometimes in severe cases the entire skin surface may be affected. Many infants with eczema recover of themselves during the second year, in others the eruption may become chronic, and may last all through childhood, even well into adult life. Many infants who have had eczema later develop asthma or hay fever.

The treatment of infantile eczema is not easy, either for the mother or doctor and all treatment must be carried out in the most detailed manner. While understanding of this disorder has increased a great deal in the last twenty years, it is in reality a most complicated condition, and there are many aspects of it about which but little is known.

The first step in the investigation of any case of allergic eczema is to determine the allergens to which the infant is sensitive. This is done by making many small scratches on the back, and applying to each scratch, extracts of various foods and environmental allergens to which the infant may have been exposed. Sensitivity to an allergen is indicated by a raised red blotch, something like a large mosquito bite, appearing in about fifteen minutes on the particular scratch to which the allergen in question has been applied. These tests have helped a great deal in the study of the allergic diseases, but they are by no means entirely reliable, for sometimes a patient will fail to give a positive skin test to an allergen to which he is really sensitive, or he may give a positive test to one to which he is not sensitive and which has nothing to do with the cause of his eczema. A positive skin test indicates, therefore, only a possible, not a certain, causative factor.

An eczematous infant is tested with all the foods he is eating, and with a number of the common environmental allergens, such as wool, feathers, house dust and silk. Let us consider for a moment the foods which most infants eat at the age of six months, and their relative importance in the causation of allergic eczema. Most infants at this age are eating cows milk, wheat cereal, various vegetables, sometimes egg yolk, cod liver oil and orange juice. Positive skin tests are most frequently obtained to egg, milk and wheat. The frequency of positive tests to egg at first glance seems strange, for most of these babies were not eating it when the eczema began, and many of them have never eaten it at any time. Furthermore, the sensitization to egg is usually a very violent one, and many of the egg-sensitive babies will be made severely ill if they eat it, and may immediately break out with hives all over the body. There has been much discussion

about why there is this sensitivity to egg in young infants who have never eaten it. The most commonly accepted theory is that they were sensitized to it before they were born by egg eaten by the mother during her pregnancy. So while egg sensitivity is very common in these babies, and may be of high degree, it is not often the cause of the eczema unless the baby is eating egg, which he usually is not.

The situation is very different for milk, as the baby is daily taking large amounts of it. Indeed it has seemed to me that sensitization to cows milk is the commonest single cause of allergic eczema in infancy. Wheat sensitivity is likewise common, and about doubles in incidence after the fifth or sixth month, when most babies begin to take cereal. Sensitivity to peas or spinach is not uncommon. Positive skin tests to orange are not common, but the mother often notices that the baby begins to itch, or that his skin becomes redder, soon after taking orange juice, so that it may be of more importance than is indicated by the skin tests. Sensitivity to fish oil is not common, but may occasionally exist and, when it does, may be of high degree.

There have been many different diets recommended in the treatment of infantile eczema, which have had a brief period of popularity and have then been discarded. At the present time most of those who have made a study of the subject believe that the discovery of the food or foods to which the infant is sensitized, and removal of these from the diet, is the best method of dietetic treatment now available. Such treatment does not always prove successful, however. Furthermore, it must not be forgotten that many causes of infantile eczema have nothing to do with diet, and may come from outside causes. Mothers and many doctors have been too ready to believe that any and all forms of skin eruption in infants are of food origin, but this is not so.

It must be remembered that the patients we are dealing with have a particular type of constitution. The skin symptoms may often be helped by removal of sensitizing foods from the diet, but the type of constitution is not changed, the patient still has his abnormal capacity for becoming sensitized to other foods or environmental allergens, substances such as dust and feathers, as he becomes older, and may develop asthma or hay fever in childhood, even if his eczema in infancy has been cured by the removal of the special offending foods.

In planning a diet for eczematous children it is necessary to bear in mind that it must be an adequate one, no matter what the skin tests show—the whole child is more important than his skin. There is usually little difficulty, however. There are many cereals and vegetables from which to choose if sensitivity exists to one of the group, and if there is sensitivity to orange or tomato juice, vitamin C in tablets, in the form of ascorbic acid, can easily be substituted. Milk offers the greatest difficulty. In cases with milk sensitivity there are three methods of feeding that may be used.

(1) Evaporated cows milk may be tolerated. In the process of evaporating milk it is heated very hot, which to a certain extent changes the albuminous portion of the milk, so that it may sometimes be taken by milk sensitive infants when fresh milk cannot. It is the best form of milk to use in infantile eczema if cows milk is to be used at all, but is in my experience not so efficient in eczema as it sometimes is in other forms of milk sensitivity, and I have not seen many milk sensitive eczematous infants cured by the use of evaporated cows milk.

## CORRESPONDENCE

## CONTROL OF SYPHILIS

*To the Editor* I have been interested in the prevention of contagious and infectious diseases, especially gonorrhea and syphilis, for over twenty five years. I have made a careful study with the purpose of preventing these diseases. This has been done quite successfully in other countries and can be done in this country.

I have had bills introduced into the legislature dealing with the prevention of syphilis and gonorrhea, and since Dr Parran has brought these diseases out into the open, and other states in the union have passed legislation which aims to protect young men and girls at marriage, I have studied the statutes of those states and introduced a bill last year picking out the important parts of the statutes of other states and improving them, in my opinion, to make them more workable. In my last year's bill, I had a section covering a minimum fee for such examinations, with the main purpose in mind to prevent politicians from accusing us of having a racket. There was some objection to it, and I took this section out of my bill this year.

In all those states having premarital legislation, when syphilis is found in one or both parties, the law does not permit the issuance of a license, and this has been a very serious objection from the clergy. My bill eliminates this and does not prevent marriage, providing whichever one of the couple happens to have syphilis is willing to come before a commission of three specialists in venereal diseases, agrees to take an immediate first treatment and takes oath before the other partner that he or she will continue to take the treatment regularly on the appointed time, to be given by some competent, experienced physician in syphilis or at some clinic, as ordered and until discharged by the physician or by the clinic.

I believe that this bill, House Bill 1828, covers the situation as well as can be done at this time without antagonizing the clergy, who are of the opinion that marriages are made in Heaven and should not be interfered with.

The bill is as follows

## HOUSE BILL 1828

## AN ACT REQUIRING CERTIFICATES OF NEGATIVE BLOOD EXAMINATION OF BOTH PARTIES WITH FILING OF MARRIAGE INTENTION

Be it enacted by the Senate and House of Representatives in General Court assembled and by the authority of the same as follows:

Chapter two hundred and seven of the General Laws is hereby amended by inserting after section thirty seven, as appearing in the Tercentenary Edition the following new sections—

SECTION 37A. The clerk or registrar shall not issue a marriage license unless both parties shall have presented a certificate signed by a regular practitioner of medicine, practicing in the commonwealth showing that a blood examination of both parties has been made within ten days, separately and individually in which a serological complement fixation or flocculation test was made at a regularly approved laboratory registered under the laws of the commonwealth and that both tests have been negative for syphilis, or unless any such party who fails to present said certificate presents a certificate of a practicing physician that such party has been Wassermann fast during a period of three years and received not less than forty arsenic injections and not less than fifty heavy metal injections.

SECTION 37B. A test for gonorrhea shall be requested of both applicants for marriage license but this examination shall be voluntary only on the part of the female and may be waived by her if she refuses such examination.

SECTION 37C. Said certificate shall be considered confidential and is contained in a separate file designated for such purpose.

SECTION 37D. When so ordered in writing by the judge of probate court of the district in which the marriage is to take place, who in his opinion believes that public policy or the physical condition of either one of the parties requires that the intended marriage be celebrated without delay the requirements of sections thirty seven A and thirty seven B shall be waived on the above order of the judge of the probate court. Such order must be placed on file and recorded and the registrar shall issue the marriage license forthwith, but at the earliest opportunity or within ten days following such marriage, blood examination certificates of each party to the marriage, made by a regular practitioner of medicine in the commonwealth must be filed to complete the marriage law requirements.

SECTION 37E. Any party to a marriage who wilfully or deliberately tries to evade the requirements of sections thirty seven A to thirty seven D by having some one else take the blood examinations for him or her and presents the results as his or her own shall be punished by a fine of one hundred dollars or by imprisonment not to exceed ninety days.

SECTION 37F. Any physician who shall wilfully or deliberately make any false statement in any certificate provided for in section thirty seven A and thirty seven B shall be punished by a fine of one hundred dollars.

SECTION 37G. Any registrar or town clerk who fails to carry out the duties imposed upon him under sections thirty seven A, thirty seven C and thirty seven D shall be punished by a fine of one hundred dollars for each case.

SECTION 37H. That a commission of three physicians specialists in syphilis and venereal diseases be appointed to carry out the duties and regulations of this premarriage law. The decision of this commission on a disputed case shall be final.

(1) This commission shall be appointed by the governor of the commonwealth for terms of one, two and three years respectively at a salary of five hundred dollars and transportation fares per annum. One member to be designated as the chairman and another as secretary. This commission shall meet once weekly and as often as is necessary to act on individual cases.

(2) Vacancies to be filled as they occur each year by the governor of the commonwealth.

The main purpose for the enactment of this law is to discover syphilis at the earliest possible moment, to institute immediate treatment and not to prevent marriages.

At a hearing at the State House on March 28, in talking to Dr Lund, chairman of the Committee on State and National Legislation of the Massachusetts Medical Society, he stated that he was of the opinion that we needed some legislation on syphilis but he felt that in order to have any passed, we should have to have some milder form of a bill. His committee felt that Representative Cutler's bill with some modification would be the proper bill to have introduced to start the ball rolling. Although I could not get myself to agree with him at first, I finally decided not to push my bill too hard, especially so as I learned at the hearing on March 28 that there were many organizations in favor of Representative Cutler's bill, with the changes made in it.

My other bill, House Bill 1827, deals mainly with pregnancy. This requires a prenatal blood examination for all pregnant women. It should be done as a part of a routine examination on the first visit to an obstetrician or the serological test should be made before the end of the third month. Many of our leading obstetricians and general practitioners have a blood test made as a routine examination in all their cases. This should be universal. Legislation is necessary to make it so.

It is quite generally agreed by our leading specialists that when syphilis is discovered early in pregnancy—the sooner the better, but before the end of the fourth month—the mother can still give birth to a normal baby in over 90 per cent of the cases, and at the same time, the mother is on her way to prevent organic changes in some organs and to rid herself of this dread disease.

This bill with minor changes was favored by Dr Jakmauh, Representative Cutler and Dr Lund. I agreed to the changes. There was no opposition to the enactment of such legislation.

The bill is as follows

## HOUSE BILL 1827

## AN ACT REQUIRING A SEROLOGICAL BLOOD TEST FOR SYPHILIS OF PREGNANT WOMEN PREFERABLY BEFORE THE END OF THIRD MONTH OF GESTATION

Be it enacted by the Senate and House of Representatives in General Court assembled and by the authority of the same as follows:

SECTION 1. Chapter one hundred and fifteen of the public health laws is hereby amended by adding to section one a provision that a serologic blood test for syphilis shall be made of every pregnant woman.

SECTION 2. Every physician attending pregnant women in the state during gestation shall in the case of every woman so attended take or cause to be taken a sample of blood of such woman at the time of first examination and submit such sample to an approved laboratory for a standard serological blood test for syphilis. The term approved laboratory means a laboratory approved for this purpose by the state department of health or in any city by the department of health of the city laboratory—that is Boston health department laboratory. A standard serological blood test for syphilis is one recognized as such by the state department of health or in any city by its health department laboratory.

SECTION 3. In reporting every birth and stillbirth physicians and others permitted to attend pregnancy cases and required to report births and stillbirths shall on and after March first nineteen hundred and thirty nine, state on the birth certificate or stillbirth certificate, as the case may be, whether a blood test for syphilis has been made during such pregnancy upon a specimen of blood taken from the woman who bore the child.

tasis In this series 45 per cent had definite, and 33 per cent indefinite, sinusitis The discovery of a sinus condition is not only of etiologic interest but of great therapeutic importance Sinus involvement cannot be ruled out without a roentgenological examination Treatment of sinusitis cannot be expected to influence existing bronchial dilatations except, perhaps, in the small child, but it is a prerequisite for the attempt to arrest the process

The symptoms found in the group did not conform to current beliefs The general condition was poor in 25 per cent and just fair in the rest Copious expectoration, however, occurred only in about two thirds, and odorous sputum, supposedly an outstanding characteristic of the condition, in less than half Hemoptysis occurred frequently enough to be eliminated as a criterion in the differentiation of bronchiectasis from other pulmonary diseases, especially tuberculosis.

One or both lower lobes were involved in 54 cases (90 per cent) Of single lobes, the left lower one was most frequently affected (33 per cent) There is no good explanation to offer for the frequent involvement of the left lower lobe.

The therapy of bronchiectasis, until very recently, has been a disappointing chapter Conservative procedures, such as general management, postural drainage, bronchial lavage and bronchoscopic treatment, are palliative and any improvement is merely symptomatic By meticulous care the progressive bronchial dilatation will, at best, be delayed, and the patient remains an easy victim for complicating or intercurrent disease Collapse therapy has, on the whole, proved itself a failure During the past few years very encouraging results have been reported from removal of bronchiectatic lobes Lobectomy, however, requires a unilateral, or practically unilateral, involvement In suitable cases the patient should be urged to submit to operative treatment.

The most important of all therapies, prevention, has been sadly neglected up to now There is a good deal of parental negligence toward chronic, upper respiratory infections and moderate chronic bronchitis in children The threat of a severe and permanent bronchial damage is practically unknown People to whom tuberculosis is a household word have not heard of bronchiectasis, although physicians recognize it as, next to neoplasm, the most hopeless pulmonary disease, so far as resutution of the diseased part of the lung is concerned Great concern is felt when a child aspirates a foreign body, considerable attention is paid nowadays to impairments of the respiratory function from allergic causes, but the danger of the slow and continuous drainage of infected material into the bronchial passages and of the resulting bronchitis is underestimated And yet, it is the chief causative factor in bronchiectasis, especially of the extensive and life-threatening variety We should venture to say that in proportion to the growing recognition of the role which chronic sinusitis has in this disease, its occurrence should decrease At present it needs to be looked upon as a public health problem requiring the efforts of agencies concerning themselves with public health By propaganda, examination of the sinuses, including a roentgenogram, should be suggested to the parents and guardians of all children in whom no other cause of a chronic cough can be found The competent treatment of sinus conditions should be suggested.

The drier regions of the country offer hope to those who

have, or are threatened with, chronic nonspecific infections of the respiratory tract.

#### LUNG ABSCESS

While bronchiectasis is characterized by chronicity of events, lung abscess nearly always begins as an acute involvement Its chronicity occurs from the lung's inability to rid itself promptly of infected material, while the bronchiectatic lesion is largely produced by the very process of chronic elimination It can be estimated that an abscess becomes chronic in somewhat more than one or two months of duration of illness The average duration until death or recovery in this series of cases was slightly over four months Etiologic factors were equally divided between aspiration from extrapulmonary infections and other causes Symptoms depend on the virulence of the invading micro-organisms and the local tissue response but chiefly on the degree of bronchial connection with the abscess and the resulting possibility of spontaneous drainage Physical findings comprise the whole array of pulmonary signs

The primary aim in treatment is to assure adequate drainage of the abscess If this cannot be done promptly, surgical drainage should not be delayed On the other hand, most abscesses which refuse to heal spontaneously become localized quickly and can be operated with greater safety than in the acute stage Postural drainage by using a bed which can be tilted in all directions has been used successfully by the authors The mortality was 50 per cent.

Preventive measures should include education of the public and the medical and dental professions to promote dental care, warning against unwarranted and unskillful tonsillectomies and tooth extractions, and preventing upper respiratory infections — Reprinted from *Tuberculosis Abstracts*, March, 1939

#### NOTES

The Educational Committee of the Boston Psychoanalytic Institute has recently announced the choice of Dr Charles Brenner, Dr George E Gardner, and Dr John Romano as recipients of the Sigmund Freud Fellowships for Psychoanalytic Training

At the regular meeting of the Massachusetts Psychiatric Society, held on March 24, it was voted to make Dr Winfred Overholser, superintendent of Saint Elizabeth's Hospital in Washington, District of Columbia, and former commissioner of the Massachusetts Department of Mental Diseases, an honorary member of the society in recognition of his many years of work for the advancement of psychiatry in this commonwealth.

The acceptance by Mr Henry Parkman, Jr, corporation counsel to the City of Boston, of the general chairmanship of the Tufts College Medical School Development Program was recently announced by Dr Leonard Carmichael, president of Tufts Mr Parkman's acceptance to this top post, Dr Carmichael said, "brings into a long range program for better distribution of medical care and facilities to people throughout New England the leadership of a layman distinguished for his vision and civic mindedness in public office and in community endeavors." As general chairman, Mr Parkman will give direction and counsel to the steps necessary for the development of the New England Medical Center and its program

## CORRESPONDENCE

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I have had bills introduced into the legislature dealing with the prevention of syphilis and gonorrhea, and since Dr. Parran has brought these diseases out into the open, and other states in the union have passed legislation which aims to protect young men and girls at marriage, I have studied the statutes of those states and introduced a bill last year picking out the important parts of the statutes of other states and improving them, in my opinion, to make them more workable. In my last year's bill, I had a section covering a minimum fee for such examinations, with the main purpose in mind to prevent politicians from accusing us of having a racket. There was some objection to it, and I took this section out of my bill this year.

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for which a birth or stillbirth certificate is filed. If such test has been made during pregnancy those required to report births and stillbirths shall state the date on which the test was made. In addition to the information provided to be contained in each certificate of birth or such similar certificate of birth required in the state of Massachusetts every certificate of birth shall state whether such test was made during pregnancy or at delivery and in the case where no blood test has been made such fact shall be reported together with the reason why such test has not been taken in compliance with the provisions of section two of this chapter. In no event shall the birth certificate state the result of the test.

SECTION 4 The sum of one thousand dollars or so much thereof as may be necessary is hereby appropriated out of any moneys in the state treasury to the state department of health to cover additional clerical printing and other expenses in carrying out the provisions of this act.

SECTION 5 This act shall take effect immediately.

Sections 3, 4 and 5 will be eliminated with perhaps slight changes in the wording of Section 2. Three states now have prenatal legislation, New York among them. It is working out successfully.

My bills have been overlooked by our legislative committee and have not been mentioned.

The State Printing Office was somewhat delayed in publishing many of the bills which came after 1000. I feel that this was just an oversight as the other bills have been published in the *Journal*.

There are now fifteen states out of twenty six which have definite prenuptial statutes. There are other states which are considering such laws. Massachusetts has always been a leader in progressive legislation, and it is rather unfortunate that we have lagged behind in such a most worthy cause. It has been definitely proved by other countries that syphilis can be controlled and prevented.

Statistics show that about 40 per cent of new cases are innocently contracted. If this is so, or even near so, something should be done to stop the suffering and tragedy that syphilis causes. Since we have specific methods of treatment, the medical profession owes it to itself and to the traditions for which it stands to take immediate action and not lag behind in such a serious situation. When we compare our figures of annual incidence with those of Norway, Sweden, Denmark, Switzerland and England, especially the first three countries, we are actually put to shame.

It is a duty that each one of us owes to ourself and to the community to take an active interest in this crusade against Public Enemy Number One—Syphilis.

*Delenda est syphilis!*

H. M. LANDESMAN, M.D.

366 Commonwealth Avenue,  
Boston

\* \* \*

Dr. Landesman's letter was referred to Dr. Charles C. Lund, chairman of the Committee on State and National Legislation of the Massachusetts Medical Society, who comments as follows:

To the Editor: Dr. Landesman's two bills were given very careful consideration by the Committee on State and National Legislation of the Massachusetts Medical Society. It was believed that House Bill 1828 was altogether too complicated and that it called only for a blood test and not for a medical examination.

We have agreed to back House Bill 1827 provided the phrase beginning on line 9 of Section 2, "or in any city by the department of health of the city laboratory, that is, Boston Health Department Laboratory," and the phrase in line 13, of Section 2, "or in any city by its health department laboratory," are deleted and provided further that Sections 3, 4 and 5 are deleted.

CHARLES C. LUND, M.D.

## NOTICES

### REMOVALS

BENJAMIN F. BORNSTEIN, M.D., announces the removal of his office to The Eliot, 370 Commonwealth Avenue, Boston. Telephone KENmore 1720.

JOHN T. HARISSIS, M.D., announces the removal of his office to 307 Harvard Street, Cambridge, Massachusetts. Telephone KIRKland 5138.

### CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in the Andrew Carney Assembly Hall on Monday, April 17, at 11 30 a.m.

#### PROGRAM

##### Case Reports

Common Eye Injuries. Dr. E. F. Eagan. Discussion by Dr. James J. Regan, Dr. H. Boruchoff and Dr. A. J. Cregg.

Physicians and medical students are cordially invited to attend.

ROY J. HEFFERNAN, M.D., *Secretary*

### BOSTON LYING IN HOSPITAL

The next Journal Club meeting will be held on Wednesday evening, April 19, at 8 30 p.m., at the Boston Lying-in Hospital.

Dr. William E. Studdiford, professor of obstetrics and gynecology at New York University, will speak on "The Treatment of Abortion." Discussion will be conducted by Drs. Arthur T. Herzig and John T. Williams.

Physicians and students are cordially invited to attend.

DUNCAN E. REID, M.D., *Secretary*

### BOSTON MEDICAL HISTORY CLUB

The Boston Medical History Club will meet at the Boston Medical Library, 8 Fenway, Boston, on Monday evening, April 17, at 8 15 p.m. Dr. Elliott C. Cutler will speak on "The Darkest Days of Surgery."

Members of the medical profession and other interested persons are cordially invited to attend this meeting.

PAUL D. WHITE, M.D., *President*,  
BENJAMIN SPECTOR, M.D., *Secretary*

### BOSTON DOCTORS SYMPHONY ORCHESTRA



*Nicola Slonimsky*

Rehearsals of the newly organized Boston Doctors Symphony Orchestra, conducted by Nicola Slonimsky, are held every Thursday evening at 7 30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).



### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m. on Thursday, April 20, in the amphitheater of the Peter Bent Brigham Hospital, Dr Henry A Christian will give a medical clinic. Practitioners and medical students are cordially invited to attend.

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, April 25, at 8 15 p m., in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance)

Dr Francis G Blake, Sterling Professor of Medicine, Yale University, New Haven, Connecticut, will speak on 'The Clinical Use of Sulfapyridine in Coccal Infections'. Discussion by Dr Lewellys F Barker, Baltimore, Dr A. H. Gordon, Montreal, Dr Duncan Graham, Toronto, Dr W T Longcope, Baltimore, Dr O H P Pepper, Philadelphia, Dr David Riesman, Philadelphia, and Dr R T Woodyatt, Chicago. Dr Henry A. Christian will preside.

Medical students and physicians are cordially invited to attend.

ROBERT M ZOLLINGER, M.D, *Secretary*

### CAMBRIDGE HOSPITAL

The regular clinicopathological meeting of the staff of the Cambridge Hospital will be held at the hospital in the Margaret Jewett Hall, 330 Mt. Auburn Street, Cambridge, on Tuesday, April 18, at 8.30 p m.

All members of the medical staff are cordially invited to attend.

STEPHEN M. BIDDLE, M.D, *Secretary*

### THE FRANCIS AMORY SEPTENNIAL PRIZE OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES

In compliance with the requirements of a gift under the will of the late Francis Amory, of Beverly, Massachusetts, the American Academy of Arts and Sciences announces the offer of a septennial prize for outstanding work with reference to the alleviation or cure of diseases affecting the human genital organs, to be known as the Francis Amory Septennial Prize. The gift provides a fund, the income of which may be awarded for conspicuously meritorious contributions to the field of knowledge during the said septennial period next preceding any award thereof, through experiment, study or otherwise in the diseases of the human sexual generative organs in general. The prize may be awarded to any individual or individuals for work of "extraordinary or exceptional merit in this field.

In case there is work of a quality to warrant it, the first award will be made in 1940. The total amount of the award will exceed ten thousand dollars, and may be given in one or more awards. It rests solely within the discretion of the Academy whether an award shall be made at the end of any given seven-year period, and also whether on any occasion the prize shall be awarded to more than a single individual.

While there will be no formal nominations, and no formal essays or treatises will be required, the committee invites suggestions, which should be made to the Amory Fund Committee, care of the American Academy of Arts and Sciences, 28 Newbury Street, Boston.

### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

The annual meeting of the Essex South District Medical Society will be held at the Salem Country Club, Peabody, on Wednesday, May 10. Dr Peer P Johnson will speak on "A Trip to the Virgin Islands."

J ROBERT SHAUGHNESSY, M.D, *Secretary*

### NEW ENGLAND ROENTGEN RAY SOCIETY

The next meeting of the New England Roentgen Ray Society will be held on April 21, at 8 15 p m., in the Sise Auditorium of the Lahey Clinic, 605 Commonwealth Avenue, Boston.

#### PROGRAM

Pneumospinograms for Demonstrating Herniated Disks. Dr J L. Poppen.

The Lumbosacral Joint. Dr G E. Haggart.

Observations on the Heart in Hyperthyroidism. Dr L. M. Hurxthal.

Unusual Chest Tumors. Dr H. D. Adams.

Unusual Lesions of the Stomach. Dr S F Marshall.

Lesions of the Small Bowel. Dr E. D. Kiefer.

The Diagnosis of Lesions of the Colon. Dr R. B. Cattell.

Carcinoma of the Cervix Uteri. Dr H. F. Hare.

Carcinoma of the Thyroid. Dr F. H. Lahey.

Dinner at the Harvard Club will be served at 6.30 p m.

EDWARD C. VOGT, M.D, *President*,

AUBREY O. HAMPTON, M.D, *Secretary*

### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held on Friday, April 28.

#### PROGRAM

4 00 p m. Regular meeting at the House of the Good Samaritan.

6 30 p m. Annual dinner at the Harvard Club.

8 15 p m. Annual meeting and Henry Jackson Lecture at the Boston Medical Library, 8 Fenway, Boston. Dr Harry Goldblatt, associate director, Institute of Pathology, Western Reserve University, will speak on 'Experimental Observations on the Pathogenesis and Treatment of Hypertension.'

Interested physicians and medical students are invited to attend the meetings.

EDWARD F. BLAND, M.D, *Secretary*

### NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

Because of the holiday the regular meeting of the New England Society of Physical Medicine scheduled for April 19 will be postponed to Wednesday evening, April 26, at the Hotel Kenmore, Boston.

WILLIAM D. McFEE, M.D, *Secretary*

## NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held at the Wrentham State School, Wrentham, on Thursday, April 20, at 8 00 p m

## PROGRAM

The Bone Development in Mongoloid Deficiency Dr Clemens E Benda, Wrentham

Epidermoid Cysts Dr Thomas G Cogswell, Worcester

Nervous System Lesions in Hyperinsulinism Dr H M Zimmerman, New Haven, Connecticut

Arteriosclerosis Dr Milton C Winternitz, New Haven, Connecticut

GRANVILLE A BENNETT, M.D., Secretary

## SOCIETY MEETINGS AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, APRIL 17

## MONDAY APRIL 17

- \*11 30 a m Carney Hospital monthly clinical meeting and luncheon Andrew Carney Assembly Hall
- \*5 p m Cutter Lecture, Harvard Medical School
- \*8 15 p m Boston Medical History Club Boston Medical Library

## TUESDAY APRIL 18

- \*9 10 a m Joseph H Pratt Diagnostic Hospital Some Newer Aspects of the Treatment of Acidosis Dr Nelson R Saphir
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- \*12 m South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston
- \*8 30 p m Cambridge Hospital Clinicopathological conference.

## WEDNESDAY APRIL 19

- 8 30 p m Journal Club meeting Boston Lying in Hospital

## THURSDAY APRIL 20

- 8 30-9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and Children's hospitals held this week at the Peter Bent Brigham Hospital
- 9 10 a m Joseph H Pratt Diagnostic Hospital Medical Social Service Case Presentation District Service and Social Service Staff
- \*3 30 p m Medical clinic at the Peter Bent Brigham Hospital

## FRIDAY APRIL 21

- New England Health Education Institute Massachusetts Institute of Technology Cambridge.
- 9 10 a m Joseph H Pratt Diagnostic Hospital Ascorbic Acid Dr Allan Butler
- \*10 a m 12 30 p m Tumor clinic Boston Dispensary
- 12 m Urological conference Massachusetts General Hospital lower outpatient amphitheater
- 8 15 p m New England Roentgen Ray Society Lahey Clinic Sise auditorium

## SATURDAY APRIL 22

- New England Health Education Institute Massachusetts Institute of Technology Cambridge.
- 9 10 a m Joseph H Pratt Diagnostic Hospital Hospital case presentation Dr S J Thannhauser
- \*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

\*Open to the medical profession

APRIL 14 — Department of Mental Health Research Symposium Page 614 issue of April 6

APRIL 16 — Health Lecture Quincy City Hospital Page 636 issue of February 23

APRIL 17 — Boston Medical History Club Page 648

APRIL 17 — Carney Hospital monthly clinical meeting and luncheon Page 648

APRIL 17 — Cutter Lecture. Page 613 issue of April 6

APRIL 18 — South End Medical Club Page 613 issue of April 6

APRIL 18 — Cambridge Hospital Clinicopathological conference. Page 649

APRIL 19 — Journal Club meeting Boston Lying in Hospital Page 648

APRIL 20 — New England Pathological Society Notice above.

APRIL 20 — Medical clinic at the Peter Bent Brigham Hospital. Page 649

APRIL 21 — New England Roentgen Ray Society Page 649

APRIL 21 and 22 — New England Health Education Institute. Page 614 issue of April 6

APRIL 25 — Harvard Medical Society Page 649

APRIL 26 — New England Society of Physical Medicine (postponement) Page 649

APRIL 28 — New England Heart Association Page 649

MAY 3-6 — American Association of Mental Defect. Page 614 issue of April 6

MAY 7-15 — International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 11 — Pentucket Association of Physicians 8.30 p m Hotel Bartlett, 95 Main Street Haverhill

MAY 12 and 13 — American Heart Association Page 542, issue of March 23

MAY 13-16 — American Board of Obstetrics and Gynecology Page 457 issue of March 9

MAY 14-20 — American Physicians Art Association. Page 404 issue of March 2

MAY 15-19 — American Medical Association St. Louis Missouri.

MAY 22, 23 and 24 — American Association for the Study of Gout Page 405 issue of March 2

JUNE 5 6 7 and 8 — American Association of Industrial Physicians and Surgeons Page 581 issue of March 30

JUNE 6 7 and 8 — Massachusetts Medical Society Worcester

JUNE 12-17 — Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 125 issue of January 19

JUNE 26-29 — National Tuberculosis Association. Page 936 issue of December 8

SEPTEMBER — Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 11-15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28 — Pan Pacific Surgical Association. Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3 — New York Academy of Medicine. Page 581 issue of March 30

FALL, 1939 — Temperature Symposium Page 218 issue of February 2.

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

MAY 10 — Page 649

## SUFFOLK

APRIL 26 — Annual meeting in conjunction with Boston Medical Library at 8 15 p m Election of officers Program and speakers to be announced.

## WORCESTER

MAY 10 — Worcester Country Club — annual meeting

## BOOK REVIEW

*The Scientist in Action A scientific study of his methods*  
William H. George. 354 pp New York Emerson Books, Inc., 1938 \$3 00

It may be said that this book will provoke considerable reaction, agreeable as well as disagreeable, on the part of scientists, social workers, psychologists and philosophers. Mr George formulates succinctly the thesis that "man, whether he be infant, idiot or intellectual, from crèche almost to crematorium is seen as perpetually patterning, that speaking, writing or manipulation of apparatus in a laboratory are forms of action, but thinking, believing or feeling are not. This book should be read under the best of conditions, both physical and mental, in order that one may critically challenge the emphasis which the author makes on the possibility that in science there resides an instrument for achieving a happier social order. In view of the recent attitude taken by representatives of the American Association for the Advancement of Science and the comparable association in Great Britain, a challenge to this thesis is properly in order. Inasmuch as this review is not of the essay type, it may be pointed out that anyone interested in the thought and content of science should not only read this book but should own it and frequently take it off the shelf for reconsideration

# The New England Journal of Medicine

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## MALIGNANT MELANOMAS\*

### A Clinical Study

ERNEST M DALAND, M.D.,† AND JOSEPH A HOLMES, M.D.‡

BOSTON

OUR interest in malignant melanomas has been stimulated by the extreme pessimism expressed toward the disease by many members of the medical profession. Malignant melanomas have been recognized as probably the most highly malignant of all tumors, and we are aware of many cases in which a hopeless prognosis has been given, and for this reason no treatment advised. Furthermore, many physicians still believe that intervention of any sort will result in widespread metastases. We have been eager to learn through a clinical study of a series of cases whether surgical measures have been effective. Records totaling 174 have been reviewed. Of these, 74 were from the Pondville Hospital, 88 from the Massachusetts General Hospital, 3 from the Cancer Section of the Westfield Sanatorium, and 9 were those of private cases.

We are using the term "malignant melanoma," as recommended by Masson,<sup>1</sup> to represent the tumors variously called melanotic sarcomas, melanocarcinomas or melanocarcinomas. Masson has shown that these pigment cells are ectodermal in origin and arise from cells derived from the neural crest. While the lesions are most frequently associated with the skin, they may arise in any part of the body, as cases of primary lesions occurring in practically all structures have been reported.<sup>2-7</sup> Those in the skin usually contain a blue-black or intense black pigment which enables one to make a clinical diagnosis. There are many variations in the pigmentation, and some cells contain no pigment at all. The few cases of amelanotic malignant melanomas showed no difference in course or results from those with pigment. Lesions may be flat or raised above the skin surface and are rarely pedunculated.

No marked difference was noted in the sex incidence, as there were 79 men and 95 women in our series. Cases were found in patients of extremely diverse ages, the youngest being seven and the oldest eighty-eight, the greatest incidence was in the age group from sixty to sixty-nine (Table 1).

TABLE 1 Age Incidence

AGE	NO OF CASES
1-9	1
10-19	4
20-29	14
30-39	15
40-49	34
50-59	32
60-69	46
70-79	24
80-89	4
Total	174

Occupation was not a factor, either in the incidence or in the course of the disease.

The distribution of the lesions was of interest (Table 2). Eighty per cent of the tumors occurred

TABLE 2. Distribution of Lesions

DISTRIBUTION	NO OF CASES	PER CENT
Lower extremity	55	31.6
Upper extremity	11	6.4
Eye	25	14.4
Face and neck	41	23.5
Trunk	28	16.1
Groin and axilla (probable lymph node)	4	2.3
Meninges	3	1.7
Anus	3	1.7
Salivary glands	2	1.1
Vulva	1	0.6
Scalp	1	0.6
Total	174	

on the surface of the body, where they were readily visualized. In nearly a third of our cases they were found on the lower extremities. We wish to stress the high incidence of malignant melanomas on the feet and legs. Those in the Pondville Hospital group represented 55 per cent of all the malignant tumors on the skin of the lower extremities.

Read at the annual meeting of the New England Surgical Society, Boston, October 1, 1938.

From the Pondville Hospital and the Westfield Sanatorium, Cancer Section (Massachusetts Department of Public Health) and the Tumor Clinic of the Massachusetts General Hospital.

†Instructor in surgery, Harvard Medical School, chief-of-staff, Pondville Hospital, assistant visiting surgeon, Massachusetts General Hospital.

‡Formerly surgical resident, Pondville Hospital.

and 35 per cent of all tumors, benign and malignant, in this location

There were 25 cases where the primary focus was in the uveal tract of the eye. Only 3 of these tumors were seen as primary lesions. In many of the secondary cases at the Massachusetts General Hospital the patients had received primary treatment at the Massachusetts Eye and Ear Infirmary, and came to our clinic only after metastatic disease had appeared. For this reason it is quite possible that we do not have as high a percentage of eye cases in our series as would normally be found in the community.

Frequent sites for this condition were the face, neck and trunk. On the trunk, the majority appeared in the region of the scapula. We have no explanation of this fact, and mention it only to emphasize the importance of considering malignancy in tumors in this area. Adair,<sup>8</sup> in his study of 400 cases, states that as a rule the lesion is congenital, but in a few cases there was no previous lesion until a short time before the appearance of the malignant melanoma. Our series has failed to confirm this statement, for in only 18 per cent of the records in which accurate data were found was there a history of a birthmark. Furthermore, 33 per cent of the patients had had a lesion for less than one year (Table 3). A his-

TABLE 3 Duration of Lesions

DURATION	NO. OF CASES	PERCENTAGE OF KNOWN CASES
Present at birth	24	18.8
Less than 1 year	42	32.8
1-3 years	29	22.6
3-5 years	8	6.3
5 years or over	25	19.5
	128	
Unknown	46	
Total	174	

tory of a recent change in a lesion of considerable duration was noted in 54 cases and was considered of diagnostic importance. No instance of malignant change in a hairy mole was noted in this series. We have seen such an occurrence in one patient very recently.

Trauma has frequently been mentioned as an exciting factor in the stimulation of dormant lesions. Our investigation substantiates this in many cases (Table 4). In this disease on the foot, 8 patients gave a definite history of irritation by a nail or a tight shoe, we believe that it may be a factor in all the foot lesions. Nine patients gave a history of having had desiccation or treatment with caustics followed by an immediate proliferation of the growth. Wherever there is a possibility of a mole's being a benign or malignant

melanoma, Ewing<sup>9</sup> states that it seems advisable not to use electrodesiccation or a local cauterizing agent. Amadon<sup>10</sup> reports 27 cases treated with electrocoagulation, with 100 per cent recurrence. Biopsy, too, is a dangerous procedure, and total removal should be practiced in a suspicious lesion if one is seeking a pathological diagnosis. In 24

TABLE 4 Trauma as an Exciting Cause

SOURCE OF TRAUMA	NO. OF CASES
Electrodesiccation or use of caustics	9
Irritation by clothing	5
Shoes (definite history in 8 cases)	32
Mechanical (incision, blow, fall, etc.)	24
None	104
Total	174

cases rapid growth followed injury by incision, a direct blow or fall. One case illustrates this well. A patient experienced a chip fracture of a cervical vertebra by a fall. Two years later she developed neurological symptoms, and operation revealed a malignant melanoma involving the dura and cord at the site of fracture.

We have found that it is not necessary to have

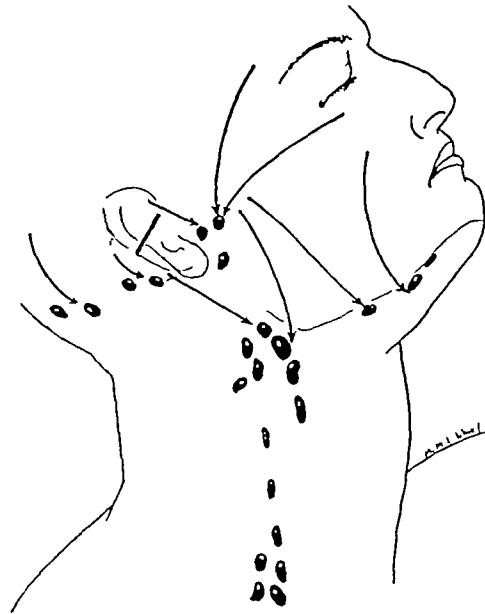


FIGURE 1 Lymphatic Drainage of the Skin of the Face

a pre-existing benign lesion or birthmark for the origin of a malignant melanoma. Many of these tumors in our series were apparently malignant from the onset. Inasmuch as pigmented moles are exceedingly common and many must be subjected to irritation, it follows that a comparatively small percentage of them ever develop into malignant tumors. When changes do occur in a mole of some duration, they may assume various characteristics. Those that have been most frequently

brought to our attention are an increase in size, an increase or decrease in pigmentation, and ulceration and bleeding. A few patients have described a sudden elevation followed by a central necrosis. These changes may occur throughout the lesion or in only a part of it (Case 25).

Once the tumors have assumed a malignant character, they may at any time produce widespread metastases. They may grow by direct extension, although this is unusual. Metastatic foci

With the above facts in mind, we have attempted to determine the ideal method of treatment. There is no surgical method of combating blood-stream metastases, and if these have occurred before treatment, cure is impossible. The first step in adequate treatment is wide excision of the local lesion, care being taken not to traumatize the tumor, and to discard any instruments coming in contact with it during removal. A wide margin of apparently normal skin is important, and the

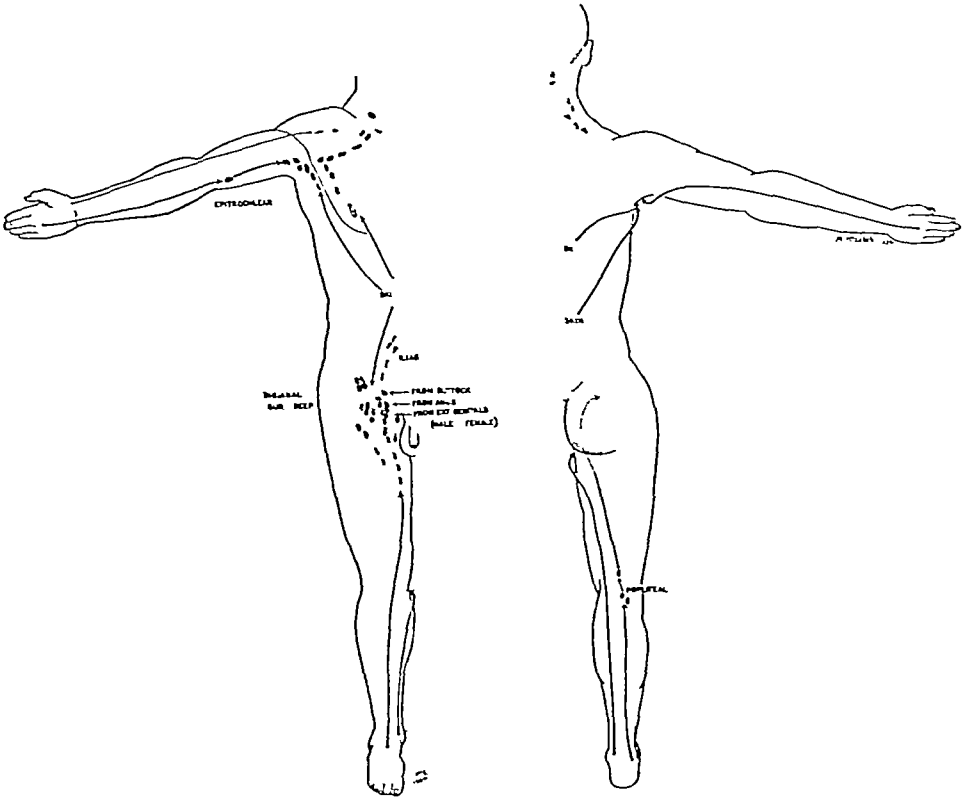


FIGURE 2 Lymphatic Drainage of the Trunk and Extremities

in the skin may occur locally or in close proximity to the primary focus, or may follow the main trunks in the skin lymphatics. By the latter route tumor cells may reach the regional nodes, or they may avoid the skin and travel solely through the deep lymphatic system to the same regional nodes. A third method of dissemination is by way of the blood stream, which may produce metastatic foci in the liver, lungs, brain, bones or skin distant from the primary lesion. This may be a primary or secondary phenomenon, that is from the primary tumor or from the regional nodes which have received tumor cells from the lymphatic system. There is no known way of predicting by which route or routes a given tumor will metastasize.

tumor should be removed without regard to primary closure. The second procedure should be the thorough removal of the regional lymph nodes, these drainage areas are illustrated in Figures 1 and 2. Such dissections are major procedures, yet if they are performed properly and at the right time, the operative complications are slight. We do not subscribe to the doctrine that regional dissection should be deferred until stray tumor cells in the lymphatics have had time to migrate to the nodes. Therefore, if there is no ulceration or infection in the primary lesion, regional dissection may be performed at the time of the removal of the local tumor. If there is a possibility of infection, the regional dissection should be deferred for at least

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FIGURE 1 *Lymphatic Drainage of the Skin of the Face*

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two weeks or until the possibility of infection in the drainage area is past. By removal of the regional nodes the lymphatic routes have been cut off. This means that if there is to be a recurrence through lymphatic spread it will occur in the region between the primary site and the scar of the regional dissection. In this way the mutilating procedure of complete removal of skin lymphatics, which would be the ideal surgical treatment, is avoided. The lymphatics between the primary site and the regional drainage area may be removed when indicated by recurrent disease. This involves removal of the skin, subcutaneous tissue and superficial fascia down to the muscles (Case 7).

We realize that the treatment outlined above cannot be carried out in all cases. In many of our aged patients such an amount of surgery would not be tolerated, and the life expectancy would not justify anything more than an adequate local excision. The location of the lesion is another factor which hinders regional dissection. Malignant melanomas located directly above the sternum (Case 18) drain primarily to the nodes of the mediastinum and to those on both sides of the neck. Removal of the cervical nodes without the mediastinal nodes is ineffective.

As malignant melanomas of the extremities are the most suitable ones for excision and regional dissection, and as they represent over a third of the cases in our series, their records were closely analyzed in order to determine the efficacy of the proposed program. For lesions on the arm to be considered as having had an adequate regional dissection, an axillary one was required, for those on the leg, an inguinal and saphenous dissection from the lowest angle of Scarpa's triangle was necessary. Many of the cases with lesions on the extremities had local excision only, and although this group is small, it offers some comparison with those receiving the full treatment outlined above. Seventeen patients had local excision only, and 8 of these were dead within three years. Three cases were too recent to evaluate, and in 3 the patients were alive and free of disease two and a half, four and six years, respectively, after excision. Three records had no follow-up notes.

The cases that had the benefit of both local excision and regional dissection were divided into two groups: those with negative regional nodes and those with metastatic disease. In the latter group there were 24 cases. Seven of these patients are living, 3 of these have been operated on too recently to be considered as cures, 3 patients are living five years after treatment, and 1 who has recently had recurrent nodules removed from the scar of the saphenous dissection is alive two and

a half years after primary treatment. Sixteen of the patients who died succumbed to distant or widespread metastases within two years. One patient lived for eleven years, only to die of probable brain metastases. Of the 13 patients who had no disease in the regional nodes, 5 were dead of recurrent disease within two years. There are 4 five-year cures, and 1 patient is free of disease after two years. Two patients were untraced.

In the group of cases which were considered operable when first seen, 16 patients died of distant metastases within a year after treatment. X-ray films of the chest, spine and pelvis were taken in most cases, and chest plates were taken routinely before operation. An exact note regarding the presence or absence of the liver edge was usually found, and although the data on melanuria were incomplete, the absence of melanin did not rule out distant metastatic disease.

Eleven patients with lesions on the extremities had either inoperable regional metastases or extensive distant lesions. All were dead within two years after treatment excepting 1 (Case 35) who showed spontaneous regression of the regional metastatic disease but died six years later of brain metastases. Three cases were lost, and 1 was not included in the group as the original saphenous dissection was not considered adequate.

There were 25 malignant melanomas of the orbit in our series. All but 3 of these were secondary cases, appearing in our clinics with metastatic lesions. In the 3 primary cases the patients are alive without disease nine and a half, six and two years, respectively, after treatment. None of the patients with secondary lesions survived.

Apparently a simple enucleation of the eye is adequate local treatment, for in only 2 cases was there a recurrence in the orbit. It is important to note that in but 1 case did we find direct metastases to the cervical nodes from a malignant melanoma in the uveal tract. There were 2 cases with widespread skin metastases where it was believed that secondary deposits from the skin tumors appeared in the regional nodes of the neck, axilla and inguinal region. Apparently no regional dissection is needed in malignant melanomas of this region.

There is indeed reason for the existing pessimism as to the permanent cure of malignant melanoma of the orbit. As explained previously, we did not have enough primary cases to enable us to draw any conclusions as to the number of cures during this period, for the patients were treated in eye clinics. We were impressed, however, by the number of patients returning with late metastases (Table 5). That tumors of this type metastasize later than any other type is common



knowledge We have known of metastatic foci appearing eighteen and twenty-five years, respectively, after operation

In this series there were late metastases to the liver in 10 cases, to the lungs in 9, to the brain in 3, to the bone in 2 and to the skin or subcutaneous tissues in 4

Forty-one patients had lesions on some part of the face or neck. These patients fall into the group where local excision and regional dissection may be performed. However, we find that neck

TABLE 5 *Time Interval from Enucleation to Distant Metastasis in Cases with Malignant Melanoma of the Eye*

TIME AFTER OPERATION	NO OF CASES
Less than 1 year	3
1-2 years	4
2-3 years	5
3-5 years	2
5-6 years	1
6-7 years	1
7-9 years	1
9-10 years	2
No recurrence	3
Untraced or recent	3
Total	25

dissection was carried out in only 8 cases. Six patients had an adequate local excision, with positive nodes found on dissection of the neck. One is untraced, 3 died in six months, fourteen months and two years, respectively, and 1 case is recent. Two patients had the same operative procedure, but no disease was found in the nodes. These are comparatively recent cases, but both patients are free from disease, one for fourteen months and the other for seven. One patient had a secondary neck dissection but succumbed in four months.

Local excision alone was done in 17 cases. Three of these patients are untraced and 1 was well for ten years and then developed a recurrence in the neck. There are 5 patients living without disease, and 4 have died without recurrence, but none in either group has or had survived five years. Four patients died of early recurrence.

Five patients received x-ray treatment without benefit, and in 6 cases the disease was too far advanced for any treatment.

There are 2 five-year cures in this group of face and neck cases. Furthermore, only 7 patients have lived three years or more after receiving treatment. Malignant melanoma of the face and neck is obviously a serious condition and the prognosis is very poor.

For lesions on the trunk, as elsewhere, the ideal treatment includes a regional dissection, but only 6 patients received such therapy. The results here were poor, 2 postoperative deaths, 3 deaths within a year and 1 case untraced. There were 3 five-year

cures by local excision alone. From the results in this small series there is little to be learned, but the probability is that a few of the patients who died of recurrent disease might have been saved if they had had the benefit of a regional dissection at the time of the primary treatment.

There were 12 cases of bone metastases from this type of tumor. The spine was involved in 3 cases, the skull in 2, the femur in 2, the ilium in 2 and multiple bones in 3. Plewes,<sup>11</sup> in a report of 97 cases from the Toronto General Hospital, found bone metastases in only 2 cases. Geschichter and Copeland<sup>12</sup> demonstrated bone metastases in only 3 of 169 cases. While the incidence of bone metastases is relatively low, even with our incomplete data, 12 cases were found in 174 cases studied.

The results of roentgen therapy were extremely poor. Twenty-two cases received sufficient therapy to determine their sensitivity. Of these, 2 patients (Cases 33 and 34) responded to treatment. One patient who received therapy to metastatic nodes showed good response but died in eight months of cerebral metastases. The other showed complete disappearance of a large mass in the groin and at least regression of lung metastases and was free of all symptoms two and a half years later. These results as a whole are in contrast to such reports as are found in the literature.<sup>13</sup>

The results of treatment are not very encouraging. Of the 90 patients who came to the hospital for primary treatment 50 are dead. There were only 13 five-year cures and in only 3 of these cases were there positive regional metastases. Of these 90 primary cases 21 were treated within the last five years. Six received palliative irradiation and 2 were untreated. This leaves 61 cases in which cure was attempted more than five years ago and 10 untraced. The percentage of cures in the primary group is 21.

The secondary cases include those in which local excision, cauterization, electrodesiccation or incision was done before entry, and those patients who had received adequate primary treatment elsewhere and were admitted for the treatment of late metastases. The results in this group are very discouraging. There are 2 patients, however, with regional metastases who have been cured for a five-year period. Two others are free from disease fourteen months and two and a half years after treatment, respectively. Two died of intercurrent disease three years and four years, respectively, after treatment.

There were 84 secondary cases in this series, but only 24 were treated with any possibility of cure. Three of these are recent. We thus had 2 five-year cures out of 21 possible cases, with 2 patients

untraced The percentage of cures in this group was 9

Of all cases, both primary and secondary, there were 3 five-year cures out of a possible 35 in the group with regional metastases In the group without regional metastases, there were 12 five-year cures out of a possible 47 The curability of the operable cases in this series, then, was 9 per cent in cases with regional lymph-node involvement, and 25 in those without it

### CONCLUSIONS

The prognosis in malignant melanoma is very poor However, a few patients can be cured by adequate surgery

There is a high incidence of malignant melanomas on the lower extremities, and they represent more than half of the malignant tumors of the skin in this region

Malignant melanomas arise in congenital pigmented nevi or as spontaneous primary growths They rarely arise in pigmented, hairy nevi

Trauma to a pre-existing lesion is probably a factor in stimulation of lawless growth Cauterization or desiccation is dangerous

Metastases may occur through the skin lymphatics or the deep lymphatics or via the blood stream

Adequate surgical treatment includes wide local removal and thorough dissection of the regional nodes We realize that the latter procedure is not always feasible

In malignant melanomas of the eye, enucleation is adequate treatment

Roentgen therapy is extremely unsatisfactory, it rarely there is benefit It should be considered inoperable cases

Spontaneous regression may occur in the metastases

While the prognosis is particularly poor in cases with regional lymph-node involvement, an occasional cure may be obtained Patients should be given the benefit of adequate regional dissection

### CASE REPORTS

#### VE WITHOUT RECURRENCE

*Case 1* (M G H 268876) A 60-year-old woman was admitted to the Massachusetts General Hospital in 1925 with a pigmented lesion of the finger Amputation of the finger and epitrochlear and axillary dissections were performed, with a positive report on the finger and a negative one on the nodes She was recently examined and found to be well (Survival, 13½ years)

*Case 2* (private) A 47-year-old woman was admitted to the New England Deaconess Hospital in 1927 A black mole on her forearm had been removed 2 years before She complained of a large mass in the axilla with pressure on the nerves of the arm Dissection of the axilla was done with little expectation of anything more than relief The pathologist reported melanotic sarcoma in the

nodes The patient has been examined regularly since then and is free from recurrence. (Survival, 10 years.)

*Case 3* (M G H 296322) A 41 year-old man was admitted to the Massachusetts General Hospital in 1929 He complained of a tumor of the inner aspect of the leg of 4 years' duration There had been gradual growth and ulceration and the tumor had become pedunculated. Excision and saphenous dissection were done. The primary growth showed melanotic sarcoma, but the nodes were negative. A letter from the patient in 1938 stated that he was in good condition except for stomach symptoms which he had had for several years There has been no examination, but he is probably free of disease. (Survival, 9½ years)

*Case 4* (private) A 24 year-old man complained of failing vision. A pigmented tumor of the iris was found and enucleation was carried out by an ophthalmologist. The pathologist reported the tumor to be a malignant melanoma. The patient was free from disease 9½ years later

*Case 5* (M. G. H. 292449) A 25-year-old woman was admitted to the Massachusetts General Hospital in 1928 A nodule on the forearm appeared 2 years previously Three months before entry a node was felt in the epitrochlear region and 1 month later one in the axilla. The tumor was excised together with the epitrochlear and axillary nodes, all of which showed malignant melanoma The patient was examined and found free of disease in 1937 (Survival, 9 years)

*Case 6* (P H. 4252) A 63-year-old housewife entered the Pondville Hospital in February, 1932. She had had a mole on her back for 6 years Three weeks before admission it began to grow and the skin about it became inflamed Local examination showed an elevated crusted lesion of the skin overlying the lumbar spine. Wide excision of the lesion was done without regional dissection The pathological report was malignant melanoma. Since then she has been well and free of disease. (Survival, 6½ years)

*Case 7* (P H. 4272) A 51 year-old male entered the Pondville Hospital in February, 1932 Nine months before admission he had struck his heel and broken the skin. His shoe had kept this lesion irritated and a few weeks

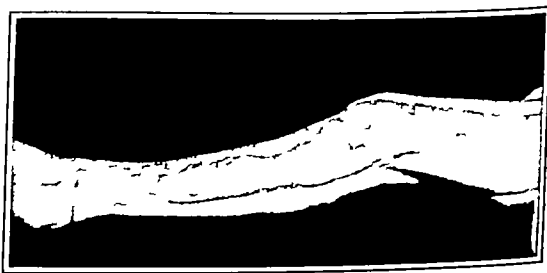


FIGURE 3 Case 7

*The recurrent nodules in the skin have been removed with the skin, subcutaneous tissue and fascia, and the defect grafted*

later his physician had cauterized it with silver nitrate. Six weeks before admission he had noticed a swelling in the right groin. An indurated growth 3 cm. in diameter was found on the inner aspect of the right heel There was a freely movable mass of nodes in the right saphenous

region. A wide excision of the local lesion together with a saphenous and inguinal dissection was done. The pathological report was amelanotic malignant melanoma with metastases to regional lymph nodes. Four months later the patient noticed nodules on the inner aspect of the leg and entered the hospital for excision of the skin of the inner side of the leg. This required multiple skin grafts (Fig 3). The nodules were amelanotic malignant melanomas. The excised skin measured 51 by 8 by 15 cm. He later had a recurrent nodule removed from the upper end of the scar but was free of disease 6½ years after treatment.

*Case 8* (P. H. 5309) A 52-year-old housewife was admitted to the Pondville Hospital in August, 1932. She had noticed poor vision in the left eye for a number of months. In the upper inner quadrant of the left eye the iris was bulging forward. Posterior to this there was an apparent hemorrhagic pigmented area of new growth. Enucleation of the eye was performed and a diagnosis of malignant melanoma of the iris was made. She has since been free of disease. (Survival, 6 years.)

*Case 9* (M. G. H., Baker, 9358) A 41-year-old woman was admitted to the Massachusetts General Hospital in March, 1933, for an abdominal operation. She called our attention to a pigmented mole on her back. This had been present for several years and had shown no recent change. It was excised with a wide margin and showed melanotic sarcoma. No regional dissection was done, as there were no palpable nodes in either axilla. The patient was apparently free of disease in September, 1938 (Survival 5½ years)

*Case 10* (M. G. H. 330480) A 25-year-old woman was admitted to the Massachusetts General Hospital in 1933. A mole on the dorsum of the hand, which had been traumatized frequently, grew rapidly and spread to the axillary nodes. Amputation at mid forearm and dissection of the axilla were done. The pathologist reported a very rapidly growing melanotic sarcoma of the amelanotic type. A letter from the patient in 1938 stated that she was well. (Survival, 5 years)

*Case 11* (M. G. H. 337411) A 62-year-old woman was admitted to the Massachusetts General Hospital in 1934 with a tumor over the malar prominence of 3 years duration. There had been a gradual increase in size, but there were no palpable nodes. Excision with a plastic closure was done, but there was no regional dissection. The pathological report was melanotic sarcoma. A letter from the patient in 1938 stated that she was well. (Survival, 4½ years.)

*Case 12* (P. H. 4412) A 34-year-old man was admitted to the Pondville Hospital in March, 1932, with a growth on his leg of 12 years duration. There had been rapid growth for 1 year without antecedent trauma. The lesion was elevated, non-ulcerated, and slightly bluish. Only wide local excision was performed. Since then, he has been well. (Survival, 4½ years.)

*Case 13* (M. G. H. 339669) A 63-year-old woman was admitted to the Massachusetts General Hospital in 1934 with a lesion on the sole of the foot. This had been desiccated in the Out Patient Department 2 weeks previously but had promptly recurred. A wide excision was done without regional dissection, with a report of melanotic sarcoma. A letter from the patient 4 years later stated that she was well. (Survival, 4 years.)

*Case 14* (M. G. H. 307524) A 43-year-old woman was admitted to the Massachusetts General Hospital in 1930 with a lesion 2.5 by 2.5 cm. on the chest wall. This was excised and reported to be a malignant melanoma. Five years later there was a local recurrence and a second excision was done, with a positive pathological examination. No regional dissection was done. The patient was free from disease in 1938 (Survival, 8 years.)

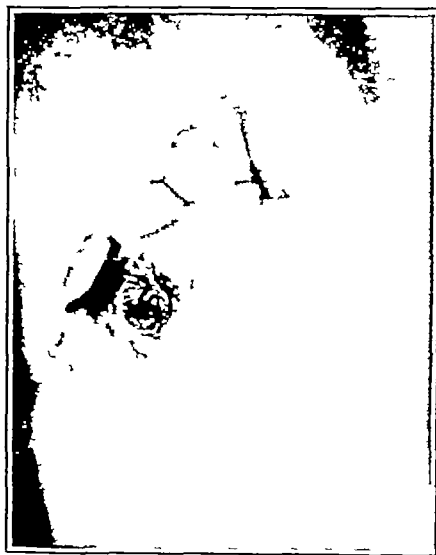


FIGURE 4 Malignant Melanoma of the Foot  
Partial amputation was performed. Dissection was advised but refused. The case is now untraced.

*Case 15* (M. G. H. 85397) A 27-year-old woman was admitted to the Massachusetts General Hospital in 1935 with a pigmented lesion on the buttock. A wide excision with a saphenous and groin dissection was done. Pathologically this was a melanotic sarcoma with positive nodes. There was a recurrence in the scar 2½ years later but no further trouble in the regional drainage area. The second pathological report was positive.

*Case 16* (P. H. 10536) A 64-year-old housewife entered the Pondville Hospital in March, 1936. She had been blind in the left eye for 13 years. An enucleation of the eye had been done at an outside hospital 1 month before admission. Examination showed a mass of red tissue covered with mucous membrane protruding between the eyelids. An exenteration of the left orbit was performed and a diagnosis of malignant melanoma was made. The patient was living and well 2½ years after operation.

*Case 17* (P. H. 9797) A 15-year-old girl entered the Pondville Hospital in August, 1935. A birthmark on the left cheek had grown larger and blacker since birth. A pigmented nevus 3 mm. in diameter was removed, and the pathological report was that of malignant melanoma. No neck dissection was done. There was no evidence of recurrence 2 years after treatment.

*Case 18* (P. H. 11116) A 52-year-old woman was admitted to the Pondville Hospital in July, 1936. She had had a mole on the neck for 5 years. Recently it had grown larger and become black. Examination showed an irregularly shaped, deeply pigmented nevus 1 cm. in diameter just above the clavicle and just to the right of the

midline of the neck. Wide excision was performed, but no regional dissection, as one of the primary lymphatic drainage areas was to the nodes of the mediastinum. The patient was well and free of disease 2 years after excision.

**Case 19 (P H 11745)** A 42 year-old housewife entered the Pondville Hospital in November, 1936. For 10 years she had noticed a firm swelling over the distal joint of the left great toe. The swelling gradually increased. On the



FIGURE 5 *Malignant Melanoma of the Great Toe*  
*This patient died ten months after operation*

dorsum of the left great toe, a large, lobulated, slightly purplish, firm tumor was found. The tumor was found to be encapsulated and was excised locally. No saphenous or inguinal dissection was done. The diagnosis was that of malignant melanoma. The patient was well and free of disease 22 months after the local excision.

**Case 20 (P H 8521)** A 32 year-old housewife entered the Pondville Hospital in July, 1937. A birthmark just below the right ear had started to increase in size 7 weeks before admission. A wide excision of the lesion was done, followed by neck dissection 3 months later, postponed because of a low grade dermatitis. The pathological report was malignant melanoma without metastases to the regional lymph nodes. Soft nodes overlying the sternomastoid muscle were removed in 1938. These were negative. The patient was well and free of disease 14 months after treatment.

**Case 21 (P H. 12606)** A 36-year-old woman was admitted to the Pondville Hospital in June, 1937. Two years before admission she had had a mole removed by freezing. The mole had been present only a few months but was black and ulcerated. A month after removal a small lump was felt in the region of the trapezius muscle. This had gradually increased in size. Examination showed a 7-cm. mass in the subcutaneous tissue in the region of the trapezius muscle. There was no recurrence locally, and

the mass was removed together with a dissection of the posterior carotid triangle. The pathological report was malignant melanoma with metastases to the cervical lymph nodes. The patient was well and free of disease 14 months after operation.

**Case 22 (P H 12780)** A 66-year-old man was admitted to the Pondville Hospital in July, 1937. He had had a smooth, slowly growing mole on the left cheek for 15 years. He had noticed that this was becoming thicker. Examination showed an irregular, black, movable lesion in the center of the left cheek. In the central portion of the lesion there was a warty, raised, thickened area. A wide local excision with plastic closure was done. The diagnosis was that of malignant melanoma. No neck dissection was done. The patient was well and free of disease 13 months after operation.

**Case 23 (P H. 11908)** A 49-year-old housewife was admitted to the Pondville Hospital in January, 1937. Six months before admission she noticed a lump near her rectum. Four weeks previously part of the tumor was removed and the pathological report was melanotic sarcoma. A radical excision of the scar was performed and only one focus of tumor cells was found in the specimen. Five months later a node was found in the right groin, and inguinal and saphenous dissections were done. Nodes were positive for metastatic malignant melanoma. The patient was well and free of disease 18 months after the primary excision and 12 months after the inguinal and saphenous dissections.

**Case 24 (M G H. 100780)** A 33-year-old woman was admitted to the Massachusetts General Hospital in December, 1937, with a black mole on the neck below the ear. A wide local excision was performed and the mole was found to be a malignant melanoma. A radical neck dissection was performed 1 month later but the nodes were negative for tumor. One lymph node which lay above the clavicle appeared black grossly, but anthracosis was found microscopically. The patient was apparently free of disease in August, 1938. (Survival, 9 months)

**Case 25 (M G H., Baker, 107537)** A 41 year-old woman was admitted to the Massachusetts General Hospital in February, 1938. A pigmented mole on the instep which had been present since birth had changed in appearance and had become sore over a period of 8 months. Examination showed a flat, brown lesion 2.5 by 2 cm., the center of which was raised, indurated and pinkish. Clinically the center appeared malignant and the periphery benign. This proved to be the case when the lesion was excised. A dissection of the saphenous and inguinal regions was done 6 days later and negative nodes were found. There has been no recurrence in the 7½ months since operation.

**Case 26 (W S., Cancer Section, 258)** A 57 year-old woman was admitted to the Westfield Sanatorium in March, 1938, with a lesion on the cornea. One year before a similar lesion had been treated by radium, apparently with benefit. Biopsy showed a melanotic sarcoma of the amelanotic type. The eye was enucleated. The patient was apparently well 6 months later.

**Case 27 (M G H., Phillips House, 106785)** A 77 year-old man was admitted to the Massachusetts General Hospital in January, 1938, with a black mole of 5 years duration on his back but with recent enlargement. Several other flatter lesions with less pigment had been treated by

a dermatologist with radium over a period of 2 years. He had advised against treatment of any sort for the black mole. However, excision was done and a positive report obtained. This patient has been followed for about 6 months and is apparently well.

**Case 28** (W S, Cancer Section, 449) A 22-year-old woman was admitted to the Westfield Sanatorium in May, 1938, with a lesion on the lower eyelid of 1 month's duration. It had been treated by an electric needle before entry. Excision was done at once, and the report was amelanotic sarcoma. Because the removal did not appear to be wide enough for this type of tumor, a wider removal was done by excising half the eyelid and reconstructing a new eyelid. The second microscopic examination showed more of the same type of tumor. This patient has been followed for but 2 months after operation.

**Case 29** (M. G. H., Baker, 131786) A 68-year-old man was seen in consultation in May, 1938. He said that a pigmented tumor had been present on his face for 4 years. Two years previously he had been treated with an electric needle and the tumor had partially disappeared. Six weeks before examination a node had appeared in his neck. Operation was advised and accepted. The primary tumor together with the skin between it and the node was removed, and a radical dissection of the neck was done. Pathologically this was melanotic sarcoma with metastasis in a node adherent to the parotid gland. This is a very recent case and has been followed but 2 months.

#### DIED WITHOUT RECURRENCE AFTER FIVE YEARS

**Case 30** (M. G. H. 200519) A 60-year-old man was admitted to the Massachusetts General Hospital in 1915. A mole on the leg of 10 years' duration broke down and crusted over. A wide excision with saphenous and inguinal dissection was done. The primary lesion showed melanotic sarcoma, but the nodes were negative. The patient was found free of disease 2 years later. He died of other causes in 1936. (Survival, 21 years.)

**Case 31** (M. G. H. 295000) A 74-year-old man was admitted to the Massachusetts General Hospital in 1928 with a nodule on his back measuring 5 by 6 cm. Excision was done and the tumor was found to be a melanotic sarcoma. There was an immediate recurrence and a second excision, again with a positive report. The patient died without recurrence 5 years later.

**Case 32** (M. G. H. 268397) A 75-year-old woman was admitted to the Massachusetts General Hospital in 1925 with a 2-by-2-cm. pigmented mole on the cheek. The lesion was excised and reported to be a malignant melanoma. The patient died 10 years later without recurrence.

#### TREATMENT BY X-RAY

**Case 33** (M. G. H. Baker, 15387) A 67-year-old man was seen in consultation in June, 1936. A short time previously he had been operated on for a large tumor in the femoral region. The tumor proved to be unremovable. It was a rapidly growing amelanotic type of malignant melanoma. When examined he had a large mass in the inguinal and saphenous region and the tumor could be felt in the pelvis. There was some swelling of the leg and a lymph sinus in the wound. X-ray treatment was given to the mass as a palliative measure. A total of 4000 r (200 kilovolts) was given through a 15-by-15-cm. field to the mass in the pelvis, groin and saphenous region, the treatment being spaced over 2 weeks. There was immediate regression and disappearance of the tumor. Three months later the patient complained of a

severe cough. A chest plate showed probable pulmonary metastases. He was given 800 r both to the front and the back of the chest. His cough cleared up at once. During the 2½ years since treatment he has had no recurrence of the tumor in the groin. Chest plates show no changes. He is free from symptoms and is able to continue at his work.\*

**Case 34** (P. H. 13063) A 64-year-old man was admitted to the Phillips House in September, 1937. He had had a mole on his back in the region of the scapula for several years. Ten months before admission this became sore and was excised by his doctor. Three weeks later his neck began to enlarge, and nodes were later noted in his axilla. Two months previously he had noted nodes in his groin. Examination showed a diffuse, hard mass above the clavicle, and a baseball-sized mass in the axilla which was adherent to the deep structures. A chest plate showed no evidence of metastatic disease. The patient received 1200 r to the right axilla, right supraclavicular area and scrotum in October, 1937. The masses in the axilla and supraclavicular areas showed regression, and in December, 1937, he received an additional 600 r to each of these areas. In March, 1938, further radiation, 1200 r to the axilla and 600 r to the groin, was given.

#### CASE WITH SPONTANEOUS REGRESSION

**Case 35** (P. H. 1064) A 43-year-old man was admitted to the Pondville Hospital in January, 1929. Two years before admission he had had the 5th toe removed for a black tumor. An inguinal dissection had been done. Several months before admission he had had erysipelas of the lower leg, followed by the appearance of black nodules. Multiple nodules were found over the lower leg, and there was a fixed mass in the groin but no nodules above the operative area. The case was considered inoperable and no treatment was given. A year later the masses in the thigh began to disappear, leaving only the pigment. The masses in the thigh finally disappeared, and the patient died of probable brain metastases 6 years after his first admission.

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#### DISCUSSION

DR. GEORGE F. DWINELL, Manchester, New Hampshire. This is a peculiarly difficult subject to discuss because we do not see very many of these cases. One hundred and fifty-eight cases is an unusual number to report. I have

This patient died in March, 1939, following operation for a strangulated hernia. An autopsy showed no trace of his original tumor and no metastases.

looked up several series, and 50, I believe, was the next highest number that anyone reported, and I think this series shows results about as good as are shown elsewhere. Twenty per cent is a high incidence of five-year cures

We have no large series in Manchester, and I have not attempted, nor has Dr Wilkins, to look up all our cases, but he has asked me to bring before the society that following a definite routine which he has adopted, and which I have used, we have 3 outstanding cures. One is that of a patient with a lesion on the face who has had no recurrence for over ten years (The mortality is very high in face cases). The other 2 had lesions of the extremities. One of the latter came to me three years ago, and I did not think of the possibility of melanoma. I took a biopsy, thinking the case was probably one of fibrosarcoma, and that was the report which the pathologist made on the little piece that I sent him, but later I dissected the nodes of the groin and found a typical melanosarcoma.

The point which Dr Wilkins wishes me to bring out is that perhaps we have been a little bit lax in our treatment. These cases must be handled perhaps a little more radically than Dr Daland and Dr Holmes brought out. All our modalities should be used. The method we use consists, in the first place, of large doses of buried radium, not in the lesion but surrounding it, and also radium on the surface. By large doses I mean 1800 mg hours—200 mg of needles and tubes buried around the lesion for nine or ten hours. This is to be followed in about three weeks, at which time the height of the radium reaction is supposed to occur, by complete excision. This means wide excision, at least 1 cm. away from the lesion, extreme care being taken not to touch the lesion. Furthermore—and Dr Daland does not agree in this—we believe that dissection of the nodes should be deferred for two or three weeks. As you know, melanoma gives a very peculiar pathological picture. It does not travel the way that ordinary cancer cells travel. It travels in the skin, usually just under the surface. Our idea was to allow these cells to reach the lymph nodes and be caught there before dissection. We follow up the regional lymph node dissection with a thorough course of deep x-ray therapy.

After this I do not believe that any more can be done. The 3 cases previously mentioned have been treated by this method, and have remained free from recurrences for ten, three and three years respectively.

This is the main point that Dr Wilkins wished me to bring out that we ought to do a little more than we have in the past for these cases, and should not merely say

that radium has no effect. The effect of our initial radiation, I think, is purely and simply one of fibrosis. All these tumors practically disappear. I do not believe that the radium kills the growth, but that loss of nutrition does, however the method is worth trying in the way that Dr Wilkins suggests.

DR. EDWARD H. RISLEY, Waterville, Maine. I should like to emphasize a point which I have only recently learned from a bitter experience. I think most of us have always assumed that a melanotic tumor could be recognized by the melanosis in the tumor itself. I find that this is not so. There are many small tumors which appear on the forearm, and on other extremities, which look like small fibromas or some other form of tumor, but which on removal turn out to be malignant melanomas.

I operated on a woman of thirty-six for what felt like a fibroma on the forearm. I excised it with the endotherm and found that she had no diseased nodes in the axilla. The pathological report was malignant melanoma. In July the patient had a well-developed metastasis in the axilla, and the following December she died of a brain metastasis.

I have seen one other case of a similar nature, and I believe we should not do biopsies on these tumors of the extremities, we should excise them and then get our diagnosis, rather than depend on a biopsy, which is many times not a safe procedure.

DR. GRANTLEY W. TAYLOR, Boston. I should like to ask whether Dr Daland and Dr Holmes have a program of therapy for pigmented nevi.

DR. DALAND (closing). We found no case with a history of hair in the nevi, nor have we found any described in the literature. There was only 1 case with a lesion on the scalp. Adair has quoted a study of 250 patients who had an average of twenty pigmented nevi per patient. We may talk about removing all pigmented nevi, twenty from each of 250 patients, but it cannot be done. There are not enough surgeons to do it, but if there is a pigmented nevus in a place where it is subject to any type of irritation, it should be excised and not be treated by desiccation.

I am glad that Dr Risley brought out his point. Fully half these cases show no pigment, but I want to emphasize again that most malignant tumors of the skin of the leg are carcinomas or malignant melanomas, and should be excised. Let the pathologist see the tumor after it has been removed in its entirety.

## THE TREATMENT OF CHRONIC PRURITUS VULVAE WITH LOCAL APPLICATIONS OF ESTROGEN\*

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THERE are few conditions which confront the physician that are more resistant to treatment than is chronic pruritus vulvae associated with leukoplakic and kraurotic changes of the labial skin. The intolerable itching frequently assumes such proportions that, despite attempts at palliation with antipruritic salves or lotions, alcoholic injections and exposure to x-rays, there is continual psychic trauma and loss of sleep, resulting in general physical debility. These cases, to which no demonstrable cause has as yet been assigned, may be classified as an essential type as differentiated from the commoner type in which the skin changes are not a prominent feature and the causative factor or factors are apparent and remediable.

Cases of pruritus vulvae other than the essential type are the result of local irritation from chronic cervicitis, trichomonas vaginalis vaginitis, infection with the epidermophyton, diabetic or infected urine or obesity with gross uncleanness. This type rarely continues to the chronic state, because adequate treatment directed to the removal of these respective causative factors relieves the patient of her symptoms.

It is the purpose of this paper to present a hypothesis for the pathogenesis of the essential type of chronic pruritus vulvae with leukoplakic and kraurotic changes, and to report the results following treatment of a group of 4 cases with locally applied estrogenic substances. The collective term "leukoplakic vulvitis" will be used in referring to these cases.

Although the results following denervation of the affected area offer some encouragement in the control of this condition, the permanency of relief is not established and the procedure is contraindicated in some 40 per cent of cases (Learmonth et al.,<sup>1</sup> Montgomery et al.<sup>2</sup> and Usher and Campbell<sup>3</sup>). A still more radical approach to therapy is vulvectomy, which is not infrequently followed by considerable local discomfort and frequent recurrences. Vulvectomy has its usefulness in cases of malignancy, or in cases where malignant changes are anticipated.

Disturbance in ovarian function has for many years been considered an etiologic factor in leukoplakic vulvitis, but it has not been proved

an important one. The most probable reason for this may well be the fact that substitutive treatment with estrogenic hormones has proved unsatisfactory. In most cases, however, this treatment has been started many years after pruritus, the first and frequently the only symptom, was noted by the patient.

There are many facts which support the theory of decreased ovarian function as a contributing causative factor. The statistics of reported series show that the average age of occurrence of leukoplakic vulvitis is 52 years, an age well past the time when the ovary begins to fail in function. The region of the vulva in women may possibly be considered as a true "sexual skin." In the monkey and in certain of the great apes that skin about the vulvar and gluteal regions manifests marked vascular changes coincident with the follicular phase of the menstrual cycle. This great reddening and edema seen in young animals at the time of ovulation has been shown to be due to the unopposed action of estrogen (Allen<sup>4</sup>). Although no such sexual skin has been demonstrated in the human being, it appears likely that a homologous area may exist and be specifically affected by estrogen. Such a concept receives support from the observation that considerable atrophy of the vulva normally follows castration and the menopause. It is quite conceivable that this physiologic atrophy may render the cutaneous area more liable to pathologic changes incident to any damaging influence.

There is significant histological evidence that in the cases under consideration there is a progressive disintegration of the elastic fibers in the corium. This loss of elasticity, together with the epithelial changes, results in a thickened and rigid skin which cracks easily, opening portals for subepithelial infection. Several factors may then irritate the nerve endings sufficiently to produce a sensation of itching. Once pruritus is established, the constant trauma of scratching inevitably leads to excoriation of the skin, and eventually to a chronic pathologic state with hyperplasia and sclerosis in variable proportions.

Parenteral estrogen therapy has offered relief to only a small percentage of women suffering from leukoplakic vulvitis. As stated above, the treatment has in most cases been instituted many years after the onset of symptoms, conceivably

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after the local changes have been established for a long time

It appears that parenterally administered estrogen, even in large amounts, is less efficacious in local conditions than smaller amounts locally applied. This has been shown to be true in treating Neisserian vaginitis in children and young girls before puberty, and senile vaginitis at or after the menopause. Lyons and Templeton<sup>5</sup> have shown that locally applied estrogen is two hundred times as effective as parenteral estrogen on the vagina of a rat. In view of the rapid destruction of estrogen in the organism (Dingemanse and Laqueur<sup>6</sup>), it seems reasonable to expect that constant and continuous local action of estrogen can be better attained by frequent local applications. That estrogen is readily absorbed when applied to the human skin has been shown by Salmon,<sup>7</sup> Zondek,<sup>8</sup> and subsequently Klasten<sup>9</sup> and Reifferscheid,<sup>10</sup> reported successful therapy of pruritus vulvae by local percutaneous application of estrogen combined with large doses parenterally by injection. While this investigation was in progress it was noted that these earlier investigators<sup>8, 9, 10</sup> had used the estrogenic material in the form of a salve. Following their suggestion a lanolin base was used in the later treatment of the cases reported below. This has the advantage of greater ease of application and has proved just as efficient a vehicle as sesame oil. Local application has therefore been employed in the therapy of the cases reported below.

#### METHOD

The vulva and epipubic and perineal skin are thoroughly cleaned and dried. Estradiol\* in sesame oil (0.5 mg per cubic centimeter) is thoroughly massaged into the skin of the affected area. One cubic centimeter (60,000 international units) is used for each inunction at two- to six-day intervals. The patients are instructed to use no additional treatment. After the pruritus is controlled, smaller amounts, in the form of a salve with a lanolin base, are applied daily by the patient.

#### CASE REPORTS

*Case 1* A. D., a 44 year-old woman, who had had five children, was seen on June 24, 1938. A persistent, severe pruritus vulvae of 2 years' duration had not been influenced by any of various antipruritic ointments or lotions. There was no associated leukorrhea, glycosuria or infected urine. In August, 1935, the intrauterine application of 1200 mg hr of radium for functional bleeding was followed by amenorrhea until August, 1936, when there was another

application of 1200 mg hr of radium for recrudescence of bleeding. There had been no further bleeding.

Physical examination showed extensive whitening of the skin of the labia majora with markedly thickened plaques of leukoplakia extending to the epipubic region. The labia minora were atrophic, and the vulvar orifice was narrowed. There were several excoriations. The uterus, cervix and vagina were atrophic.

An inunction of 60,000 units was applied on the first day. In 2 days, considerable relief was noted, and complete relief followed the application of 255,000 units over a 16-day period. Treatment was discontinued in order to determine the permanency of relief. No bleeding occurred after the withdrawal of estrin. After 6 weeks of complete relief there was a recurrence of the pruritus. One inunction of 60,000 units on August 26 brought about relief. The patient was then given a salve with a lanolin base containing 20,000 units of Estradiol per gram. By applying a small amount every evening she has remained symptom free for 3 months, having used 20 gm. of the ointment.

*Case 2* E. G., a 72 year-old woman, who had had one child, was seen on July 1, 1938. The menopause had occurred 22 years previously. Persistent pruritus vulvae of several years' duration had been associated for the previous 2 years with marked incontinence of urine. On April 5, 1938, a plastic repair was performed, with only partial relief of the incontinence and no influence on the pruritus.

Physical examination showed extensive involvement of the labia majora by multiple plaques of white, thickened epithelium. This extended to the thighs and the epipubic and perianal regions. The labia minora were replaced by thickened, white, shiny skin, and there was marked narrowing of the vulvar orifice. The entire area was moist, and there were many deep excoriations with secondary infection. The cervix and uterus were atrophic.

Six applications of approximately 60,000 units each, over 4 weeks, resulted in considerable but not complete subjective relief. However, in spite of the complaint of continued pruritus the excoriations incident to the long practiced scratching disappeared. Inasmuch as the incontinence was not corrected, it appears that in this case the irritation from the urine played a part in the production of the pruritus. However, with daily applications of small amounts of a lanolin salve containing 60,000 units of Estradiol per gram the patient has had sufficient relief to allow uninterrupted sleep.

*Case 3* J. K., a 35-year-old woman, who had had two children, was seen on July 25, 1938. Persistent pruritus vulvae of 3 years' duration was associated with vaginal discharge due to a chronic cervicitis with polyposis of the endocervical canal. Catamenia were regular and normal. Excision of the polyps and cauterization of the canal with a post-cautery in April, 1938, was followed by a diminution but not complete disappearance of the discharge. There was, however, no relief from the pruritus, and treatment with antipruritic salves and lotions was without effect.

Physical examination showed marked thickening of the vulva and of the perineal skin extending to the epipubic and perianal regions. The skin was grayish, and there were many excoriations. The cervix was well healed, and the canal smooth. There was, however, some purulent discharge from the endocervix at the internal os. The uterus and adnexa were normal.

\*The estrogenic material and the lanolin salve were prepared and furnished through the courtesy of Dr. Max Gilbert of the Schering Corporation, Bloomfield, New Jersey.



Three applications of 60,000 units of Estradiol in oil, at weekly intervals, followed by five applications of 30,000 units at 3-day intervals, resulted in marked though not complete subjective relief. The attacks, however, were of short duration as opposed to attacks before treatment lasting for hours. The vulvar skin appeared more normal and was less thickened and there were no excoriations.

The patient was given a lanolin salve containing 60,000 units of Estradiol per gram. By applying a small amount every evening, the patient has since experienced complete relief from the pruritus.

*Case 4.* L. N., a 44-year-old woman, who had had two children, was seen on August 12, 1938. There was persistent though mild pruritus vulvae of 16 years duration, associated with vaginal discharge and chronic cervicitis with polyposis of the endocervical canal. Catamenia were regular and normal. Excision of the polyps and cauterization of the cervical canal with a post-cautery were followed by a disappearance of the discharge. Relief of the pruritus was then noted except for an area in the epipubic region.

Physical examination showed the vulva to be normal in appearance except anteriorly in the epipubic region, where the skin was white, markedly thickened and excoriated. The cervix was well epithelialized, the canal smooth and there was no discharge. The uterus and adnexa were normal.

Over a 31-day period, 220,000 units of Estradiol in oil was applied to the affected area in daily divided doses. This was followed by relief of the pruritus and disappearance of the excoriations. By daily using a small amount of lanolin salve containing 60,000 units of Estradiol per gram, the patient has remained symptom free. She was last seen, October 17, when the skin of the epipubic area was normal in color and texture.

It is apparent from these reports that the local application of a strong solution of estrogen has effectively remedied both the subjective symptoms and objective signs of pruritus vulvae. It is significant in this investigation that the psychological factors have been eliminated, in that objective criteria have been used in measuring the degree of relief. The patient's subjective sensations did not influence the objective sign of pruritus, namely the inevitable excoriations of the skin. The disappearance of these lesions can be accepted as evidence that the symptom had been relieved, if

not completely cured. This objective evidence of relief was found in all the cases cited.

The noted effects can scarcely be ascribed to the oil, because all cases had been treated with emolient salves without any effect, and one patient (Case 2) experienced no relief of pruritus with daily inunctions of oil over a trial period of seven days. It was also observed that the relief obtained with a preparation containing 20,000 units of Estradiol per cubic centimeter of oil was very transient as compared with that obtained by using the more potent preparation (60,000 units).

#### CONCLUSIONS

A hypothesis for the pathogenesis of leukoplakic vulvitis on an endocrinological basis is presented.

A simple method of treating leukoplakic vulvitis by local application of estrogen is offered. It is recommended because continuous local action simulating normal physiological conditions may conceivably be attained by frequent inunctions by the patient.

The results obtained in treating a small group of 4 cases justify further investigations on selected cases to determine more definitely the doses required and the permanency of relief.

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## AN OUTBREAK OF INFECTIOUS DIARRHEA AMONG NEWBORN INFANTS

ARTHUR M. KIMBERLY, M.D.\*

WORCESTER, MASSACHUSETTS

**D**URING November, 1937, an extremely disastrous epidemic of infectious diarrhea broke out among a group of newborn infants on the Pediatric Service of the Worcester Memorial Hospital. The clinical features and pathologic findings closely resembled those described by Rice and others<sup>1</sup> in their report on sixteen outbreaks of infectious diarrhea occurring in the nurseries of eleven hospitals in New York City. We have reason to believe that our cases arose directly following the admission to the ward of an infant who had been discharged six days before from a hospital in New York City.

By overcoming the natural reluctance of any one hospital to report its disastrous results, Dr. Rice, who is Health Commissioner of New York City, and his collaborators are to be highly commended for correlating and reporting the experiences of these hospitals. They contend that the cases of diarrhea covered in their report constitute a distinct disease entity, basing their argument on the following grounds: exact similarity of clinical picture, specificity of age group, the occurrence being exclusively among newborn infants, uniformly high morbidity and mortality rates (46 per cent mortality among 505 infants), highly contagious nature of the infection, inability to identify the causative organisms by ordinary bacteriological measures, and extremely mild pathologic findings referable to the gastrointestinal tract, associated, however, with secondary pyogenic infections. The cases here reported fulfill these criteria exactly.

We were extremely unfortunate in the group of infants that were housed on our Pediatric Service when the epidemic developed. As the highly infectious nature of this diarrhea became apparent, we placed the babies under increasingly strict isolation precautions, until finally each surviving infant was in a room by itself under entirely separate nursing care. Through prompt removal from the ward, two postoperative cases of hypertrophic pyloric stenosis were protected from infection. It is important to enumerate the facts concerning the babies who acquired the infection.

*Case 1* D, a girl, was admitted to the hospital November 10, 1937, when 1 month old, the birth weight had been 7 lb. One week previously she had been discharged from

a New York City hospital, where she had been exposed to a case of diarrhea. On admission she weighed 5 lb, 15 oz., she was vomiting and having frequent loose movements, and appeared extremely toxic.

*Case 2* P, a premature boy, was born outside the hospital and brought immediately to it, the birth weight had been 3 lb, 3 oz. At 1 month the weight had increased to 4 lb, 7 oz. The diarrhea started November 11. Several temperature reactions occurring previously were thought to be due to instability of his temperature-control mechanism.

*Case 3* G1, a girl, was one of twins born in the hospital, the birth weight had been 4 lb, 2 oz. This infant offered considerable difficulty in taking her feedings, and on the 20th postpartum day (November 11), when she began to vomit and have loose, green stools, she weighed 4 lb, 5 oz.

*Case 4* G2, a twin sister of Case 3, had weighed 4 lb, 4 oz., at birth. This infant also presented difficulty in feeding, and on the 21st postpartum day (November 12), when diarrhea began, she weighed 4 lb, 12 oz.

*Case 5* B, a boy, was born during the course of pneumonia of his mother, the birth weight had been 7 lb, 12 oz. When 1 week old, he was weaned and placed on a formula, at this time the weight was 6 lb, 14 oz. The following morning (November 16) six or eight loose, greenish yellow movements occurred.

*Case 6* F, a boy, was referred, when 6 days old, from an out-of-town hospital for correction of a complete cleft palate and left harelip, the birth weight had been about 6 lb. On admission his weight was 5 lb, 10 oz. Because of his handicap, considerable difficulty was experienced in feeding, and at the onset of the diarrhea on November 18, when he was 21 days old, he weighed 6 lb, 2 oz.

Table 1 presents a summary of the clinical experiences with these 6 infants in course of their infectious diarrhea.

The mortality of this series is extremely high, the highest, in fact, of any of the reported series of cases. However, it is not inconsistent with an infection which extracted a case mortality of 46 per cent from the average run of healthy newborn infants who acquired the disease. Five of the 6 babies who acquired the disease succumbed to it. As appears from the above description, it would be hard to select a group of babies constituting a less favorable risk than those who acquired this infection in our ward. The infants were all within the age period which appears peculiarly susceptible to this disease. Although born of a mother who went into labor and delivered during the active course of pneumonia, Case 5, the sole survivor,

\*Pediatrician, Worcester Memorial Hospital.

was the only apparently normal infant in the group

On the second or third day of their illness, when they were passing frequent loose or watery movements, the babies began to vomit. So far as we could see, it made little difference whether tap water, cereal water, weak tea or any of the various formulas was fed, even though given in small quantities and in great dilution. The babies at this stage vomited everything taken. By dint of repeated administration of 5 per cent glucose in

The following pathological summary is based on autopsies performed by the pathologist, Dr. James Beck, on Cases 3, 4 and 6. The findings in the gastrointestinal tract were remarkably similar in each case and closely resembled those reported in other series. They were notable for their mildness. The mucosa of the stomach appeared pale and was covered by a thin film of mucous material. The duodenum showed a moderate injection. The mucosa of the entire intestinal tract was thin, yellowish and smooth. There were no

TABLE 1 Summary of Clinical Courses

CASE NO.	STOOLS	THERAPY	FEEDINGS	SYMPTOMS AND COMPLICATIONS	OUTCOME
1	8-10 daily yellow soft to yellow green watery	Clyses and intravenous glucose prostigmin	Pectin agar protein milk starvation with rice water	Temp 100-102°F vomiting distention convulsions cellulitis terminal pneumonia	Death on 12th day weight 5 lb 4 oz. autopsy refused.
2	4-6 daily yellow soft to green watery	Clyses subcutaneous blood prostigmin	Dilute evaporated milk raw scraped apple protein milk.	Temp 99-100°F distention vomiting probably terminal pneumonia	Death on 8th day weight 4 lb autopsy refused
3	6-8 daily yellow loose to green watery	Clyses subcutaneous blood prostigmin buffer solution	Olac dilute pectin agar rice water	Temp 102-103°F vomiting distention hematemesis terminal pneumonia	Death on 11th day weight 4 lb 11 oz. autopsy obtained
4	6-8 daily yellow loose to green watery	Clyses and intravenous glucose transfusion (60 cc citrated blood)	Olac pectin agar rice water protein milk.	Temp 102-104°F vomiting distention terminal respiratory complications.	Death on 14th day weight 4 lb 5 oz. autopsy obtained.
5	5-9 daily yellow loose to green watery	Clyses transfusion (60-100 cc. citrated blood) starvation 48 and 60 hr	Stepped up protein milk rice water dilute skimmed milk.	Temp 97-103°F distention	Complete recovery discharged on 25th day weight 6 lb
6	4-8 daily yellow loose to green, watery (formed before death)	Clyses and intravenous glucose 4 transfusions (40-100 cc. citrated blood) starvation 48 and 72 hr	Dilute skimmed milk breast milk, rice water stepped up protein milk.	Temp 99-103°F vomiting distention cellulitis probable pneumonia.	Death on 30th day weight 4 lb 13 oz. autopsy obtained.

saline and frequent injections of whole blood those babies who succumbed were kept alive in the order reported in Table 1, for twelve, eight, eleven, fourteen and thirty days. In view of the prematurity and other handicaps suffered by these babies at the onset of their illness they were rapidly exhausted by the constant vomiting and diarrhea. We were aware that the supportive measures of glucose, fluid and blood administration were only partly meeting the demands of this disease. An attempt was made to supply vitamins in concentrated form, but it is doubtful whether much if any was absorbed. As their general resistance was lowered, one after another acquired some sort of pyogenic infection. Two infants (Cases 1 and 6) developed subcutaneous infections at the sites of repeated injections. Nearly all the infants acquired some kind of respiratory infection. It is interesting that there were relatively few stools in comparison with the toxemia and prostration. An extremely trying feature in the clinical course was the severe and persistent abdominal distention. The cause appeared to be an adynamic condition of the intestinal musculature rather than excessive fermentation.

ulcerations or areas of hemorrhage. The loops of the bowel were distended by an odorless gas. Peyer's patches showed no enlargement. The mucosa of the colon was negative. Microscopically there was a minimum change throughout. This consisted of a moderate edema of the entire wall of the bowel, with only slight and scattered areas of leukocytic infiltration. There appeared a slight distention of the intestinal vessels, with diapedesis of blood corpuscles and hemorrhage in places. In Case 6, in which peritonitis was found, the serosa showed a mild inflammatory reaction and was covered with a small amount of exudate. All 3 of the autopsied babies showed parenchymatous degeneration of the liver, kidneys and heart, with fatty degeneration of the liver. Cases 3 and 4 showed edema of the lungs, with aspiration bronchitis from foreign material. Besides peritonitis, Case 6 showed a bilateral empyema and the congenital anomalies of cleft palate and left harelip, right cryptorchidism and Meckel's diverticulum.

The finding of *Bacillus welchii* as the predominating organism in the stools of several babies in our series is not regarded by us as being significant. No clinical or bacteriological evidence

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## REPORT ON MEDICAL PROGRESS

### GENERAL ANESTHESIA\*

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A SUFFICIENT period has now elapsed since the introduction, some five to ten years ago, of certain anesthetic agents for some crystallization of thought concerning their safety and usefulness. While in some cases a fair consensus has been arrived at, in others opinion is still sharply divided.

#### VINYL ETHER

When vinyl ether was introduced some six years ago considerable difficulty in its use was experienced by many men. During induction there was considerable mucus and there were tremors and even convulsions. There was uncertainty about the drug's effect on the liver, owing to the demonstration of liver injury in experimental work on dogs under prolonged anesthesia. These various difficulties, however, are now rarely experienced. Possibly some of this change is due to the greater purity of the drug now produced. Goldschmidt, Ravdin and Lucké,<sup>5</sup> however, have shown that liver injury does not take place in the presence of abundant oxygen. This is simply another example of the damaging effect of anoxemia on the liver when toxic agents are being used and of the protective action of abundant oxygen, an action already frequently stressed by various investigators, but still occasionally ignored by many clinicians.

While general opinion is still somewhat divided on the use of this drug, it has on the whole had a favorable reception.<sup>1, 6, 9</sup> The facts that it is only very slightly irritating to inhale, that anesthesia may be induced with great rapidity, and that recovery is rapid and generally favorable, together with its small bulk, easy portability and the lack of necessity for bulky apparatus or equipment, make it very useful in a number of circumstances. It may readily be given with a simple open cone, and makes a pleasant, rapid and smooth induction for ordinary ethyl ether. It is applicable for short general anesthesia when relaxation is desired and for these operations and for ether induction is preferable to ethyl chloride because of its greater safety. While it lacks the dangerous vascular action of ethyl chloride, however, it resembles the

latter in being very rapid and powerful in its action, and consequently it should be used with great care.

#### BARBITURATES

Opinion concerning the safety and use of the intravenous barbiturates is still divided, but they are being extensively used, and their employment seems to be increasing rather than diminishing. The increasing use in the operating room of electrical apparatus such as diathermy machines, which form potential ignition for inflammable anesthetics, together with some explosions of the latter, has focussed attention on this aspect of anesthesia and has emphasized the value of anesthetic agents such as the barbiturates, which are entirely free from danger of fire or explosion.

It is pointed out by those who oppose the use of these drugs that they resemble hypnotics rather than true anesthetics, and that the margin between the anesthetic and the lethal doses is comparatively narrow. This fact would tend to limit their use to operations which are either quite short or require only a light plane of anesthesia. It is also pointed out that their elimination is not so rapid as is that of the inhalation anesthetics. This is quite true if by the latter is meant the gas anesthetics such as nitrous oxide and cyclopropane. The difference in recovery time between ethyl ether and the intravenous barbiturates, however, is not great. Since they depend on the liver and kidneys for their detoxification and elimination they should not be used when there is severe disturbance of the function of these organs. There is a reasonable question whether elimination would not be greatly slowed up if shock should supervene.

Lundy has repeatedly pointed out that their use in children is inadvisable, but Hudson<sup>7</sup> has reported favorably on the use of Evipal in a series of 100 cases in infants and children.

With lethal doses, death takes place from respiratory rather than cardiac failure. This emphasizes the necessity for an experienced anesthetist and proper equipment for efficient artificial respiration, and again demonstrates the value of abundant oxygen, as well as the necessity for a competently functioning liver. Immediate depres-

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of the amebas or bacteria commonly found in diarrhea could be discovered in these cases. In view of the highly infectious nature of this outbreak and the extremely mild pathologic findings, in striking contrast with the severe toxicity of the infection, we strongly favor a virus infection as the primary cause. Studies made of the throats of contacts of the babies and of their foods and various fomites were unproductive in revealing the cause or method of spread of the infection.

Accepting the contention that infectious diarrhea of the newborn, as reported by Rice and others, is a disease entity, we have every reason to believe that our cases were of the same nature. Both the clinical course and pathologic findings support this view. Moreover Case 1, which was admitted to the Pediatric Service with a diarrhea already well advanced and was undoubtedly the source of infection for the other infants, had been discharged only a few days previously from a New York hospital. The superintendent of this hospital stated that before the infant's discharge she was in a ward of the hospital in which there was a case of infectious diarrhea. Knowing the highly contagious nature of this infection, we are inclined to believe that our cases originated in this manner. It is interesting to note that since this outbreak we have had no similar cases in our hospital, nor have other cases been seen by me or any of my colleagues in this area. We believe that this is the first instance of this infection to be reported in New England. However, we have heard unofficially of one or two possibly similar outbreaks. We think it important to call attention to the highly contagious nature of this disease, as a warning should other outbreaks occur.

Although our therapeutic efforts were unsuccessful in all but one case, our negative observations may perhaps be of value. Periods of partial starvation with fluid administration by mouth in the form of tap water, cereal water or saccharin-sweetened tea were entirely unsuccessful in controlling either diarrhea or vomiting. Various feedings such as dilute evaporated or skimmed-milk mixtures, protein milk, a commercial pectin-agar preparation and raw scraped apple were all ineffectual in checking either diarrhea or vomiting. Reliance had to be placed on parenteral feedings to

keep the babies alive. An approach advocated by members of the house staff was accepted by the visiting staff only after other measures had failed to submit them to periods of complete starvation lasting from forty-eight to seventy-two hours. In view of the infants' condition this seemed a decidedly hazardous procedure, but in every case the diarrhea was checked. A recurrence demanded another period of starvation. This program was undoubtedly responsible for the recovery of Case 5. The stools in Case 6 became formed after two periods of starvation and remained formed up to the time of death, which was caused by pyogenic complications. This procedure is safe only when extremely vigorous measures of fluid administration are carried out. We came to the definite conclusion that an earlier use of this measure might have saved the lives of more of the babies. Following periods of starvation the use of protein milk in minute and increasing doses appeared to be the most successful method of feeding. In treating the severe abdominal distention relatively large doses of prostigmin proved of most aid.

#### SUMMARY

A disastrous outbreak of diarrhea on the Pediatric Service of the Worcester Memorial Hospital is reviewed. Nothing positive is known of the infecting organism and therefore of the method of the spread of the infection. Ordinary ward procedures, however, proved ineffectual in controlling the infection.

The need is emphasized of regarding diarrhea occurring in this susceptible age group with the utmost concern. The safety of other contacts demands that such cases be isolated, under the most careful aseptic, individual nursing care.

The clinical aspects of the outbreak are reviewed, and a picture of the relatively mild pathologic findings is given.

The value of periods of absolute starvation followed by gradually increased feedings of protein milk is emphasized.

756 Pleasant Street.

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The intratracheal method with this and with other agents is rapidly coming into more extended use and is now commonly employed at all well-equipped clinics

#### NITROUS OXIDE

This gas has been very widely held to be one of our safest general anesthetics, if not the safest. This view is to a very large extent justified because of the fact that the gas is of very low toxicity, and because it is eliminated with such extreme rapidity that resuscitation from overdosage is usually easy. However, it is such a weak anesthetic that if used without an adjuvant such as ether it has to be pushed very vigorously in order to obtain sufficient anesthesia. This cuts down the allowable oxygen to the point where there is but a very narrow margin between anesthesia and asphyxia, and considerable skill is therefore required to hold the patient within this range. While resuscitation is very rapid and effective if oxygen is given in time, collapse is equally rapid if it is not so given. Many anesthesiologists have felt that for this reason pure nitrous oxide and oxygen was not the superlatively safe anesthesia it was generally taken to be, and that it was frequently better to add some sort of adjuvant, usually ether, thus allowing more oxygen to be used.

Courville<sup>3</sup> was the first to crystallize thoughts that had been in the minds of many, by presenting postmortem proof of extensive brain injury in 13 fatal cases. His work has been confirmed by others,<sup>8</sup> and Courville<sup>4</sup> has now demonstrated that the cerebral lesions are due to asphyxia rather than to any toxic property of nitrous oxide itself. Stewart<sup>11</sup> again emphasizes these facts by reporting a case of cerebral necrosis and death following apnea during nitrous-oxide and oxygen

anesthesia. "Neurologic symptoms," he writes, "appeared within an hour and lasted about forty-eight hours, when coma supervened. Death from pneumonia occurred on the thirteenth postoperative day. A review of the literature shows that this is not a rare sequence of events."

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This report on progress in general anesthesia seems to resolve itself into a testimonial to the value of oxygen. Its action in protecting the liver has been shown with vinyl ether (as well as with chloroform and other toxic agents). It is of great value in anesthesia with the barbiturates (as well as with Avertin). It seems highly probable that the low clinical toxicity of cyclopropane is due in no small measure to the abundant oxygen ordinarily used with that drug. The harmful effects of lack of oxygen are shown with pure nitrous-oxide and oxygen anesthesia. Altogether, this emphasizes the fact that oxygen is a life-giving necessity, and that abundance of it in general terms means safety, and lack of it danger.

605 Commonwealth Avenue.

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sive effects are proportional to the rate of administration rather than to the total dose

These drugs are being increasingly employed also as useful adjuncts to other forms of anesthesia. With local and regional anesthesia and with spinal anesthesia they are used by some for a quieting effect, sometimes without even the production of actual unconsciousness. Others employ them in combination with nitrous oxide to obtain a fireproof anesthesia of greater depth than seems advisable when either is used alone.

The two intravenous barbiturates most commonly used, the sodium salt of ethyl- (1-methyl-butyl) thiobarbituric acid (Pentothal Sodium) and the sodium salt of cyclo-hexenyl-N-methyl-barbituric acid (Evipal Soluble), while similar in many respects, are so different in many ways that in clinical use they may be regarded almost as complementary, rather than as interchangeable. Pentothal is powerful and depressing, and produces a smooth induction and good relaxation. Evipal is not so depressing, but induction is often marred by muscular tremor, and relaxation is apt to be poor. Pentothal is stated to produce liver necrosis in mice, while Evipal appears to be free from this hazard.<sup>10</sup> Further investigation of the action on the liver is now in progress, and while final results are not now available, it appears highly probable that when the liver is well supplied with glycogen and when there is no lack of oxygen during and following anesthesia, liver damage need not be feared. It is thus advisable to avoid any trace of anoxemia during the use of Pentothal as well as with other non-volatile general anesthetics.

The 10 per cent solution of these drugs which was at first recommended sometimes produced necrosis of tissue if accidentally deposited outside the vein. The 5 per cent solution now employed often causes a tender induration if spilled outside the vein, but does not ordinarily produce necrosis.

#### CYCLOPROPANE

Probably no other anesthetic has ever received such a widespread and enthusiastically favorable reception as has been that accorded this one. Since its introduction by Waters a voluminous literature has appeared which has given enthusiastic approval. Anesthetists everywhere have been most favorably impressed with its characteristics, such as very low toxicity and the large amount of oxygen which can be used with it. While comment is still very favorable it has become slightly tempered and is somewhat more discriminating. It is realized that no drug is perfect, and that this one is so powerful and depressing that untoward

and even alarming results may follow if it is given too rapidly or to too great a depth. To prevent these occurrences some clinics have adopted certain rules, such as that the rate of flow of the gas shall never exceed 500 cc per minute, or that the rate of cyclopropane flow shall never exceed that of oxygen.

Only one distinctly unfavorable report has appeared.<sup>2</sup> This records 4 cases of collapse under cyclopropane, with 2 deaths. One of these deaths, however, was largely due to other causes. The opinion is expressed that this present chapter of anesthetic history may be labeled "Cyclopropane. A surgical tragedy." This report, however, and this opinion stand alone. Nothing similar is recorded elsewhere.

At the Lahey Clinic we have had 3 deaths among 10,000 patients under cyclopropane anesthesia, 1 of them due to explosion.\* In order to see what the experience of others has been and to test present informed opinion, I have canvassed a number of the large users of cyclopropane. The replies indicate that they have used this anesthetic in 30,000 cases and have had 5 deaths attributable to the anesthetic. This, together with our experience, gives 40,000 cases and 8 deaths. If our death due to an explosion is eliminated, the mortality rate is found to be 1/5700. One of these users, who had done 5000 cases under cyclopropane without a death, stated that there had been 5 deaths under other anesthetics during the period when the former cases were being done. All these men still favor the use of cyclopropane, some of them quite enthusiastically.

The death from an explosion of this anesthetic, which recently occurred, has focussed attention on this aspect of the gas, and a meeting was held in Boston to formulate a general policy in regard to its use. It was attended by experts on electricity and explosives from the Massachusetts Institute of Technology and by surgeons, anesthetists, hospital executives and trustees of Greater Boston. After a free and thorough discussion bearing on all aspects of the explosiveness of cyclopropane and other anesthetics, it was decided to take no action looking to any curtailment of its use.<sup>†</sup>

At present, then, it is safe to say that experience with cyclopropane over the last five years has shown it to be a powerful drug which should be employed with great care and only by those well versed in its use, but that its properties in other respects are so valuable that informed opinion is now strongly favorable to its continued and rather extensive use.

\*The 2 occurring before the explosion were reported at the meeting of the Section of Anesthesia, Canadian Medical Association, Halifax, June 22, 1938.

†A summary of the discussion will be published shortly.



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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25161

#### PRESENTATION OF CASE

*Third Admission* A fifty-eight-year-old freight clerk entered the hospital for repair of a right inguinal hernia. In his family history it was noted that his mother had died of arthritis and cardio-renal disease. This was the third admission for the patient, but the records for the two previous ones had been lost. No information could be obtained regarding the first admission, except that as a child he had had a periostitis of the tibia for about three months. At the second admission a posterior gastroenterostomy for duodenal ulcer was done. There was complete relief of symptoms thereafter.

The other item of interest in the past was a story of "inflammatory rheumatism," since his early thirties. Because of this condition he had been forced to stay out of work at least two or three weeks a year. The feet were usually affected, but in recent years he had complained of arthritis of the knees and hands. He was never permanently crippled. Two weeks before this admission he began to have another attack of "rheumatism" in his feet and knees and as he was unable to get about, he thought it a "good time" to have his rupture repaired.

Physical examination showed bilateral inguinal hernias and stiffness of both knees, with some limitation of extension. The right foot was swollen, and over the dorsum of the first metatarsal there was some tenderness. The blood pressure was 120 systolic, 75 diastolic. There was a soft systolic murmur at the apex, although the heart was not enlarged to percussion.

Examination of the urine showed a specific gravity which varied between 1.008 and 1.028. There was a very slight trace of albumin on three examinations. No casts or red cells were seen in the centrifuged specimen. The nonprotein nitrogen was 32 mg per 100 cc.

X-ray examination of the knee showed slight increase in the density of the bones with no change in the joint spaces. The elbow joints were normal.

A medical consultant noted that there was little in the way of deformity after twenty-five years

of rheumatic attacks. It was suggested that a search for foci of infection be made. Both hernias were repaired, and the only complications to his hospital stay were herpes simplex and retention of urine. During the study of his urinary retention he admitted having passed on many occasions a urine which on settling showed a brick-dust deposit in the bottom of the vessel.

*Fourth Admission* (five months later) Following an accident he had a dislocation of the semi-lunar bone of the right wrist and a fracture of the styloid process of the right radius.

*Fifth Admission* (four years later) The attacks of acute arthritis continued as before. Three weeks before this entry he began to have pain and tenderness in his left foot and ankle, and his local physician advised him to enter the hospital so that pus might be drained from this area.

Physical examination showed a moderately inflamed area 3 cm in diameter over the lateral surface of the fifth left metatarsal.

X-ray showed no evidence of osteomyelitis but some calcification of the blood vessels of the legs.

The tumor mass was removed surgically and on pathological examination showed chronic inflammation and uric acid deposits.

*Sixth Admission* (three years later) His "rheumatism" had progressed somewhat, and in addition to two or three acute attacks of arthritis each year, he had a great deal of stiffness of his joints all the time. Two weeks before admission he was forced to go to bed because of swelling of his right knee and dropsy of the right ankle.

Physical examination showed swelling and some tenderness of the knee, although there was no edema or joint effusion. There was some weakness of the right leg. The temperature, pulse and respirations were normal.

An orthopedic consultant examined the patient and expressed the opinion that the patient was suffering from rheumatoid arthritis.

Examination of the urine showed a specific gravity which did not exceed 1.014 at five examinations. A very slight trace of albumin was observed on one occasion. No casts or red cells were seen. A blood Hinton test was negative. The nonprotein nitrogen was 23 mg per 100 cc. Three blood uric acid determinations were 17 mg, 55 mg and 42 mg per 100 cc respectively. The basal metabolic rate was +13 per cent.

X-ray films of the spine showed no evidence of disease of the vertebral bodies but a localized process suggestive of trauma. There were proliferative changes about the knees and the ankles.

*Seventh to Tenth Admissions* (during the next

five years) During this time he was admitted three times to the hospital On one occasion it was for a strangulated hernia, and the others for the treatment of his arthritis At each admission it was felt that he was becoming progressively weaker and had more dyspnea on exertion His activity was becoming progressively restricted While he was being followed in the Out Patient Department for the distress in his feet, he was given foot pads and shoe supports, which appeared to make his feet worse and caused him to discard them

The maximum specific gravity of his urine which was observed during this interval was 1.012 The urine contained some albumin but no casts and only rare red cells Two years before his last admission x-ray films of the feet showed a marked narrowing of the joint spaces, with hypertrophic changes No areas of destruction were seen The knees showed changes which were thought to be characteristic of proliferative arthritis X-ray films of the spine showed hypertrophic changes typical of the mixed form of arthritis

One year before his last entry the patient spent the summer traveling to the West Coast and said that he had enjoyed the trips as much as he had when he had gone twenty years before

*Tenth Admission* (one year later) He was admitted for a study of his kidney function and on this admission, inulin and creatinine clearance studies were done An electrocardiogram taken at that time showed A-V and I-V block, indicative of widespread myocardial damage Examination of his heart showed a rough systolic murmur heard all over the precordium The blood pressure was 138 systolic, 78 diastolic

*Final Admission* (two months later) He was admitted because of progressive shortness of breath and inability to care for himself at a friend's house where he had made his home Examination showed no evidence of cardiac decompensation or pulmonary edema The joints were essentially unchanged

The electrocardiogram showed no change from the previous examination The serum nonprotein nitrogen was 100 mg per 100 cc., the serum uric acid 138 mg The total fixed base was 142 milliequivalents, the sodium, 132 milliequivalents the carbon-dioxide combining power, 23 vol. per cent, the phosphate, 5.1 mg per 100 cc

He became comatose shortly after admission Two days later, without regaining consciousness, he developed hiccoughs and urea frost, and died following a terminal elevation of temperature to 104.8°F and of pulse rate to 160 per minute

## DIFFERENTIAL DIAGNOSIS

DR ALFRED KRANES It seems to me there are two questions to be answered in this case What form of arthritis did the patient have? What type of renal disease? Before we discuss the arthritis, I think it might be interesting to point out one or two factors in this history In the first place, it is interesting to note that his mother had died of the same disease or what appeared to be the same disease as the patient—some kind of joint disease and nephritis Another interesting feature is that this patient had rheumatism for about forty years, and during that period he was apparently never very much crippled by it It is stated that despite the long history of joint disease he got along fairly well Another interesting point in the history is that his arthritis probably came in attacks, although the history is not very clear on that point I am not sure just how long the attacks lasted, despite the statement that he was out of work two or three weeks each year because of them It would also be of interest to know what precipitated the attacks, if anything did, and in addition whether he was perfectly free from any joint symptoms between acute attacks

So far as the laboratory work goes, I get very little help there The x-ray films are said to have shown hypertrophic changes, but at his age one would expect them After all, he died at the age of seventy-two, and most of the studies were carried on in the last ten or twelve years of his life

I should like to see the x-rays

DR AUBREY O HAMPTON These x-ray films are more interesting than the note would lead one to believe I shall start on something I think I know a little about The heart is enlarged, and the enlargement is left ventricular, with a tortuous aorta and calcification of the arch There is also evidence of peripheral arteriosclerosis, which is seen even down to the terminal phalanges of the feet When were these films taken?

DR KRANES I believe in 1936 He was seventy years old then

DR HAMPTON The changes in the spine are those of the ankylosing type, with large spurs crossing the joints and with fairly normal joint spaces This is not what one would expect with rheumatoid arthritis but rather the changes that go with the degenerative type The lumbar spine shows practically nothing The distribution of disease in the other joints is spotty All the metatarsophalangeal and phalangeal joints are normal except for those of the first toes, while the tarsal joints are grossly abnormal There are joint destruction and fusion in these tarsal joints, certainly

more marked lesions than degenerative arthritis would produce. The joint spaces are entirely absent, and it is an ankylosing type of arthritis. The great toes at the first metatarsophalangeal joints show punched-out areas of bone destruction that certainly simulate gout. There are smaller areas in the posterior joint margins of the ankle which go with gout. In this elbow there is calcification in soft tissue with swelling at one time, and calcification without swelling the next time. At no time is there as much atrophy in the bones as one would expect. From the x-ray appearance he did not have a persistent arthritis. He used his joints between attacks.

DR KRANES. Apparently there is a good deal more in the x-ray films than in the written report. I do not believe that we have to consider many forms of arthritis very seriously. In fact there is only one that need be considered at all, namely gout. I just cannot see how any other form of arthritis could give this history plus the x-ray findings. To be sure he probably did have a lot of degenerative arthritis, but you would expect it in any man of seventy-two, regardless of what other disease he might have. Rheumatoid arthritis is extremely unlikely with a history of this type and with these x-ray pictures. After forty years of rheumatoid arthritis, coming in attacks which were apparently quite severe, one would expect much more crippling or disability and a lot more in the way of x-ray changes in other joints. Other types of specific infectious arthritis, such as gonococcal, tuberculous and syphilitic, must be mentioned, merely to exclude. They are extremely unlikely, as is rheumatic fever. I do not think we have to consider anything aside from gout.

In favor of gout is the family history of joint disease which occurs in a very high percentage of patients with gout. The harder you look for it the more often you find it. The patient's history of acute attacks that subsided and left him relatively free between attacks is also quite characteristic. There is probably some increase of urate excretion in the urine, qualitative to be sure. The statement about brick-dust deposits in the urine probably represents precipitated urates, and patients with gout have larger urate excretions than do normal people. Finally there is the episode of an apparently septic joint. Acute gouty joints frequently resemble septic joints and are operated on with the idea that pus will be obtained. In this case uric acid deposits were found, which clinch the diagnosis.

There are nevertheless a few disturbing factors so far as the diagnosis of gout goes. First are the

repeatedly normal uric acid determinations on his blood, except for the terminal one of 13.8 mg per 100 cc., which, since the patient was in uremia, is of no diagnostic value. So far as I know, no cases of gout have been encountered in this hospital with a normal amount of uric acid in the serum. Other people working in this field disagree and claim that normal uric acid values occur in many gouty individuals. Dr Talbott does not believe that and I would like to have him say a few words if this patient proves to have gout. In this connection it occurs to me that this patient had been studied over a long period of time and perhaps most of the uric acid determinations had been done by the old method. A second disturbing feature is that after forty years of gout he had developed no tophi. Thirdly, after two operations he developed no acute arthritis. Gouty attacks frequently occur after trauma and after an operation, however, this patient had two operations with no flare-up of his joint symptoms.

So far as his renal disease goes, I think it is always a guess to try to predict what type the patient has. In this patient, our first indication that he had any renal impairment occurred during his sixth admission at the age of sixty-five when it was found that his specific gravity did not go above 1.014. From that time until his death there was a slow progression of renal failure. The results of the clearance tests are not given, but I presume they were quite low, since he died two months later in uremia. I do not believe that this patient could have had glomerulonephritis at his age, at least there is no evidence of glomerular damage or of acute nephritis in the history. He was followed for a long period when his renal function was apparently normal. He was at the age of course when he might have had prostatic obstruction. However, there is no history suggesting it, and no mention on physical examination about the size of the prostate. People with gout frequently have uric acid stones. This patient had no history of having had attacks of renal colic. It is conceivable that he may have had silent stones blocking off one or both ureters and causing hydronephrosis. In the absence of direct evidence we have no right to make that diagnosis.

DR HAMPTON. He had a perfectly negative intravenous pyelogram in 1936. The kidney pelvis were large, but the calices were not dilated and he functioned fairly well.

DR KRANES. That is interesting because according to the renal function tests done before 1936 he showed impairment of concentrating power.

How about a gouty nephritis? It is well known

that a very high percentage of people with gout develop renal insufficiency, but there is not so much agreement as to the type of renal lesion that occurs. Various authors describe different types. The most consistent lesion is a vascular type of nephritis. A patient of this age with longstanding gout and evidence of arteriosclerosis throughout his body undoubtedly has a high degree of vascular nephritis. It is queer that he did not have a higher blood pressure with a diffuse vascular nephritis. There is another type of renal lesion described in gout where deposits of urates occur in the renal tubules, causing a type of renal insufficiency similar, I suppose, to the Bence-Jones kidneys of myeloma, the kidneys becoming plugged with urates. There have been a few cases described in which these urate deposits have been primarily responsible for the renal failure. I wonder if this patient, with a normal blood pressure, did not have an extensive degree of this type of nephritis. He also had a severe degree of coronary arteriosclerosis, as shown by the electrocardiogram and by the enlargement of the heart without hypertension. So I shall summarize by saying that this patient had gouty arthritis, had probably a combination of vascular and gouty nephritis, whatever that is, had severe coronary disease and probably some terminal infection such as pneumonia, having died in uremia there is a strong possibility that he may have had terminal pericarditis.

DR. JOHN TALBOTT: Dr. Krane is perfectly right in assuming that the earlier uric acids were done on whole blood. It is not unusual to find normal whole-blood uric acid, which if repeated on serum is elevated. There was one determination on whole blood (5.2 mg) which is above the normal range. The level for serum uric acid of patients with gout is 60 mg per 100 cc. or more.

So far as the x-ray films are concerned, in many cases we have given up trying to confirm a diagnosis of acute gouty arthritis by x-ray examination. I think this is a good example. The most we can say is that the changes are rather consistent with gouty arthritis and the fact that he had had his symptoms some forty years and did not have a characteristic picture does not mitigate against the diagnosis. The clinical appearance of his hands was that of advanced hypertrophic arthritis, as opposed to gouty arthritis with subcutaneous tophi that are characteristic. He had two tophi on his feet, however, which were removed surgically. The pathological report showed urate crystals. His kidney function by inulin clearance was only one-third normal. We believed that the course of the changes in the kidneys was consistent with gout. He had evidence

of renal insufficiency in one form or another, without developing terminal failure except the last few days.

DR. HAMPTON: How often do you see ankylosis in gout?

DR. TALBOTT: In about 20 per cent of our patients.

DR. HAMPTON: That is the thing that disturbed the X-ray Department. I do not remember ever having seen complete ankylosis of multiple joints as seen here in both tarsal areas. It upset me no end.

DR. TALBOTT: We have several patients that show it.

#### CLINICAL DIAGNOSES

Gout  
Coronary heart disease

#### DR. KRANE'S DIAGNOSES

Gout  
Vascular and gouty nephritis  
Generalized arteriosclerosis  
Terminal infection (? pneumonia, ? pericarditis)

#### ANATOMICAL DIAGNOSES

Gout  
Hypertrophic (degenerative) arthritis of the spine  
Urate deposits in kidney  
Healed pyelonephritis, left kidney  
Chronic vascular nephritis  
Amyloidosis of kidneys and adrenal glands  
Cardiac hypertrophy  
Arteriosclerosis, coronary, aortic and renal  
Lobar pneumonia, right lower lobe

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: At the postmortem examination all the joints examined, and they were many, showed extensive urate deposits—an extremely characteristic picture of gout. There was also hypertrophic arthritis of the spine. The remaining findings were a terminal pneumonia, a considerably hypertrophied heart, fibrotic and calcified but not particularly narrowed coronary arteries, and a pair of kidneys of which the left one weighed only 75 gm and the right 275 gm. The left kidney was very characteristic of a healed pyelonephritis. The other kidney showed a combination of lesions. There were extensive deposits of urates in the pyramids. There were fairly marked blood-vessel changes. There was also a very considerable amyloid deposit. Histologically the adrenal glands also showed moderate amyloid disease. To which of all the multiple factors the renal insufficiency was due, I do not know, prob-

ably to a combination of all three. One might speculate that the adrenal involvement had prevented the development of hypertension, in view of recent work on adrenalectomy in Goldblatt dogs

## CASE 25162

### PRESENTATION OF CASE

A thirty-seven-year-old married woman was admitted complaining of swelling of the abdomen.

Two and a half years before admission the patient had been delivered normally of her fourth baby. Following this she had sacroiliac pain. A corset and a reducing diet were prescribed, but about three or four months later she began to eat freely again. During the next two years she gained weight progressively but noted no essential abnormality until two months before admission. During the two months preceding entry her abdomen became unusually large and was thought to be abnormally hard, particularly on the left side. A mass seemed to occupy the entire lower abdomen and extended into the left upper quadrant. She noticed a sense of pressure within the abdomen, but there was no pain except for a transient stinging sensation just below the left costal margin. Her menstrual cycle had remained normal, and there were no urinary complaints. There had been slight gaseous distention and increasing fatigability. Bowel movements were normal.

Physical examination showed a fairly obese woman with slight pallor. Examination of the head and chest was negative. The blood pressure was 125 systolic, 85 diastolic. Occupying the entire left side of the abdomen was a large, rounded, non-tender, questionably cystic tumor, which was not movable. It was thought that a lower border could be palpated above the brim of the pelvis. It was seemingly, though not definitely, continuous with a similar mass in the right lower quadrant. No further details were recorded. By vaginal examination the mass could not be palpated. The cervix was slightly eroded but in normal position, and the uterus was normally mobile.

The temperature was 99°F, the pulse 60, and the respirations 20.

The urine examination showed a specific gravity of 1.020, a large trace of albumin and a rare white cell. A phenolsulfonephthalein kidney-function test showed 50 per cent excretion in two hours. The blood showed a red-cell count of 4,570,000 with 80 per cent hemoglobin, and a white-cell count of 7300 with 60 per cent polymorphonuclears. The nonprotein nitrogen of the serum was

23 mg per 100 cc. A blood Hinton test was negative.

A plain x-ray film of the abdomen showed a large, dense, smooth, rounded mass filling the entire left side of the abdomen and extending anteriorly across the midline in the lower abdomen. There were two 15-cm flecky areas of calcified density in the right upper quadrant, but no areas of calcification in the mass. All the intestinal shadows lay in the right upper abdomen. An intravenous pyelogram showed a normal right kidney. The films did not show sufficient penetration to visualize the left kidney. There was a pressure defect on the fundic portion of the bladder, which was more marked on the right side. A barium enema showed no evidence of abnormality within the colon. The sigmoid was displaced to the right of the midline, and at the level of the sacroiliac joint there was a pressure defect suggestive of external pressure. The descending colon was displaced anteriorly and medially. On these films the left kidney shadow was sharply outlined and was not displaced, the renal pelvis and ureter were grossly dilated, and the ureter appeared to be compressed at the level of the second lumbar vertebra.

On the fifth hospital day an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR FRANKLIN G. BALCH, JR. In going over the history, I cannot get much enlightenment as to the diagnosis. We have a thirty-seven-year-old woman who had gained considerable weight, particularly in the last two months. Physical examination showed that she was fairly obese and well-nourished and that there was a large mass on the left side, as described. The laboratory findings do not contribute much. She had a large trace of albumin in the urine which can be explained by damage to the left kidney. The x-ray films seem to be the most important things in reaching a diagnosis. I wonder if we can see them now.

DR GEORGE W. HOLMES. One notices first a mass in the flank which is displacing the bowel toward the right. Apparently it is not connected with the gastrointestinal tract. I should suspect that the question was to decide whether it was retroperitoneal or in the peritoneal cavity.

DR BALCH. Can you make out any definite borders?

DR HOLMES. No.

DR BALCH. Is that some of the dye retained from the previous intravenous pyelogram?

DR HOLMES. This film must have been taken

on the same day that the dye was given and rules out the kidney as the source of the tumor. The kidney is displaced somewhat toward the spine and upward. The tumor would be retroperitoneal if my interpretation is correct. I am not quite certain how much the kidney is displaced because the film was taken with the patient lying face down. I think we can say that the tumor is not in the gastrointestinal or the urinary tract and that in all probability it is retroperitoneal. There is nothing in the chest.

DR. BALCH: That helps a good deal in the diagnosis. When I first read over this case, I thought of the possibility of ovarian cyst, but on further consideration, it did not seem to fit in with ovarian cyst because, as Dr. Holmes has pointed out, the colon is displaced medially. I do not believe that even a large ovarian cyst could do that. Also, this tumor could not be felt on vaginal examination, and we should expect to be able to palpate an ovarian cyst by this method. Fibroids are ruled out by the physical examination. Another possibility of intraperitoneal tumor is mesenteric cyst, which is a rare finding and is usually freely movable, therefore we can rule that out. Splenomegaly can be ruled out by the x-ray films and the lack of other findings. So that leaves us with retroperitoneal tumors to consider.

Malignant kidney tumors, such as hypernephroma and carcinoma, I believe we can rule out by the x-ray findings. Polycystic kidneys are usually bilateral, and the x-ray films do not suggest these lesions. A diagnosis of a single solitary cyst of the kidney does not fit. Extensive hydronephrosis is ruled out by the x-rays, even though there is evidence of a hydronephrosis. Retroperitoneal and intraperitoneal echinococcus cysts have been reported, but there is nothing here that would make us consider such a diagnosis. Therefore, we are left, it seems to me, with the diagnosis of a retroperitoneal sarcoma or, more likely, a retroperitoneal lipoma. With a retroperitoneal sarcoma of this size the patient should show a good deal more emaciation than she did and an advanced state of cachexia. It seems to me that limits our diagnosis pretty much to retroperitoneal lipoma. These are known to be slowly growing and frequently asymmetrical. They have been reported as weighing as much as 60 or 70 pounds and usually start in the perirenal fat.

DR. HOLMES: May I interrupt to say that the x-ray picture is not one of lipoma.

DR. BALCH: That disturbs me. However, I still believe that it is a retroperitoneal tumor and not an intra-abdominal tumor. In spite of the x-ray findings I cannot figure out any other retroperitoneal tumor that would seem to fit this picture

so I shall stick to my diagnosis of retroperitoneal lipoma.

DR. TRACY B. MALLORY: Would anyone else like to hazard a diagnosis?

DR. AUGUSTUS S. ROSE: Was it definite that there was a second tumor in the right lower quadrant?

DR. MALLORY: That was not confirmed later.

DR. GEORGE A. LELAND: In addition to the x-ray report that was available when this patient was on the service last summer, I had the advantage of Dr. George G. Smith's examination, which is not recorded for Dr. Balch. I think what he said is of interest. The note is as follows: "The hydronephrosis on the left is probably due to pressure on the ureter by the cyst. This suggests retroperitoneal origin for the cyst. The right kidney seems normal. I do not believe there is anything about the kidney condition to indicate removal of the cyst."

In other words, those who had an opportunity to examine the patient were quite certain that there was a cyst. The protocol said that there was a questionable cystic tumor, that was misleading. The members of the X-ray Department likewise ventured into the realm of possibilities, they mentioned in their original report that "the difference in densities suggests lipoma or cyst." On account of the density of the mass, the possibility of sebaceous material was also mentioned somewhere in the history. So preoperatively we committed ourselves to a diagnosis of retroperitoneal cyst of the dermoid type. We thought that there might possibly be a developmental rest somewhere in this region.

I shall read my operative note.

A 10- to 12-cm. incision was made through the left rectus muscle, the major portion of the incision being above the level of the umbilicus. Exploration with the examining hand disclosed a large lobulated cyst which was retroperitoneal. It had displaced the descending colon toward the midline. The uterus could be identified. The right ovary was normal in size and shape, the left ovary was elongated. The liver appeared to be normal. There was nothing abnormal in the peritoneal cavity to suggest malignant disease. A puncture wound was made in the cyst, and approximately 5500 cc. of clear serous fluid was aspirated with the suction apparatus. After this had been removed the anesthetist reported that the patient's pulse had gone up very rapidly; the suction apparatus was therefore removed. The opening was closed with interrupted catgut sutures. The peritoneum overlying the cyst was then divided, and the cyst was freed, chiefly by manual blunt dissection from the descending colon and the region of the kidney. The kidney was visualized. Gradually the entire cyst was brought out through the opening and freed of its attachments. Altogether perhaps six or seven veins, none of which were over 2 mm. in diameter, were clamped. There was no main blood supply. After the cyst had been

delivered it was apparent it had no connection whatsoever with the ovary or parovarian structures. The peritoneum of the posterior wall was then brought together, and the wound was closed in layers, in the usual fashion. Evacuation of the contents of the cyst remaining after the cyst had been removed yielded about 2800 cc. Since a certain loss of fluid was inevitable when the stab wound was made, the cyst must have contained very close to 8000 cc. of fluid. On opening the cyst in the operating room there were two areas which resembled white coral, these areas were not hard.

The patient's convalescence was quite satisfactory.

#### CLINICAL DIAGNOSIS

Retroperitoneal dermoid cyst

#### DR. BALCH'S DIAGNOSIS

Retroperitoneal lipoma

#### ANATOMICAL DIAGNOSIS

Retroperitoneal papillary adenocystoma

#### PATHOLOGICAL DISCUSSION

DR. MALLORY The specimen that reached us was indistinguishable from an ordinary papillary cystoma of the ovary. It was lined with an epithelial layer, and there were short, densely fibrous papillary projections into the cyst. If I had not had Dr. Leland's word that the left ovary was found, I would have assumed, without question, it was an ovarian cyst. I do not know what its origin may have been unless some remnant of ovarian tissue had been left there in the course of the descent of the ovary. I cannot remember

ever having seen this type of cyst in retroperitoneal tissue, in fact anywhere except in the ovary.

The patient had an interesting aftermath that might be brought up. A few months after operation a tumor of about half the size of the original cyst developed in the same location, this was very suggestive of a recurrence and caused a great deal of diagnostic difficulty. Dr. Holmes, have you anything to say on that?

DR. HOLMES The mass is about the same density as that of the previous tumor. From the x-rays one is not justified in saying just what the character of the mass is. All we can say is that there is a small mass which has recurred in the same region.

I should like to point out that if it had been a fatty tumor it would have been of about the same density as air in the abdomen. Dr. Leland's statement was interesting, we are apparently growing up.

DR. MALLORY After numerous examinations the patient was re-admitted and re-explored, and a cystic mass again found in approximately the same area. A section through the wall showed a hematoma with organization, so that it was not a recurrence.

DR. BALCH The record stated that the large mass of the original tumor was continuous with a small mass on the right. Did you find any such mass?

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## CHIROPRACTIC AGAIN

THE report of the Special Commission on Osteopathy, Chiropractic, Food, Drugs and Poisons has been filed as House Bill 2151. Among other objects, the "commission was created for the purpose of making an investigation relative to establishing a board of examination and registration in osteopathy, and regulating the practice of osteopathy, [and] relative to establishing a board of registration of chiropractors, and regulating the practice of chiropractic." The commission recommends that in the case of osteopathy no legislation is necessary, but that in the case of chiropractic a board of registration should be established, "but with very strict regulations." Three matters deserve discussion: the disposition of the problem presented by the petitions of osteopathic physicians, the reason why osteopathy and chiropractic

did not receive the same treatment by the commission, and the "very strict regulations" for chiropractic set forth in the bill.

Concerning osteopathy, the report reads "After several hearings the commission is not convinced that the Commonwealth should establish a separate board of examination and registration of osteopaths. It has been asserted, and admitted, that osteopaths engage in the practice of medicine, therefore it appears to the commission that they should be required to pass the examination of the Board of Registration in Medicine." The premises are sound, in logic, there is no escape from the conclusion.

Why does not the same argument apply to chiropractic? It has been asserted, and admitted, that chiropractors engage in the practice of medicine. Furthermore, the report reads "Evidence was presented to the commission that there are many chiropractors illegally practicing in Massachusetts today, many of them being incompetent. For this reason we feel that a board of registration should be established." "Practicing" would seem to constitute the practice of medicine—an opinion upheld by the Supreme Judicial Court of Massachusetts in the Zimmerman case. If this be so, why should there be any discrimination between the statutory regulation of osteopathic practice and that of the chiropractors? Is it a good policy to legislate according to the dictum that the more illegal and incompetent practitioners there are, the greater is the need for lower standards of practice?

Restriction of space prevents discussion of all the details of the bill, but a critical point is found in Section 87F, defining chiropractic "Chiropractic, or the system, method or science commonly known as chiropractic, or the practice of chiropractic, is hereby defined to be the science of palpating and adjusting the articulations of the human spinal column. This definition is inclusive, and any and all other methods are hereby declared to be not chiropractic." This is jargon triumphant. "Practice" or doing is defined as "science" or knowing. Furthermore, "the very strict regulations" appear to be unenforceable.

delivered it was apparent it had no connection whatsoever with the ovary or parovarian structures. The peritoneum of the posterior wall was then brought together, and the wound was closed in layers, in the usual fashion. Evacuation of the contents of the cyst remaining after the cyst had been removed yielded about 2800 cc. Since a certain loss of fluid was inevitable when the stab wound was made, the cyst must have contained very close to 8000 cc of fluid. On opening the cyst in the operating room there were two areas which resembled white coral, these areas were not hard.

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uent had undergone an appendectomy at twelve years of age and had had measles and mumps when she was twenty-three. Catamenia began at eleven, were regular with a twenty-eight-day cycle and lasted six days. She usually flowed profusely and with a great deal of pain on the first day. Her last period was November 26, 1921, making her due for delivery September 2. Her previous pregnancies had resulted in a normal delivery at term and a miscarriage at six weeks. The present pregnancy had been normal throughout.

When seen at home, the uterus was the size of a full-term uterus, the fetal heart was distinctly heard, and the vertex was presenting in the OLA position. The uterus was contracting every five or six minutes and relaxing well between pains. Labor had begun indefinitely at 5 p. m. A vaginal examination at 1 a. m. on September 11, showed the cervix more than half dilated, with intact membranes. The membranes were ruptured artificially, and the progress of labor became rapid. The baby was born shortly after 2 a. m. There was a median tear of the perineum at the site of a previous laceration. As soon as the baby was born, there was a large amount of fresh bleeding which showed that the placenta had separated. With each contraction, blood gushed from the vagina. Because of this, the placenta was immediately delivered by the Credé method. It came away intact, but the membranes were not complete. There was so much bleeding at the time that the perineum was not sewed up. Posterior pituitary extract, ergot and morphine were immediately administered, and a firm uterine contraction occurred, however, the patient went into profound shock. She perspired freely, was very white and asked for water. Her blood pressure was 80 systolic, 60 diastolic. She was given a quart of water by rectum, which was not retained. Heaters and blankets were applied, and the foot of the bed was elevated. There was no further bleeding. Her condition gradually improved, and at 7.30 a. m. she was in good condition with a pulse of 100 and with much improved color. Her subsequent convalescence was uneventful save for a mild sepsis due to retained membranes.

*Comment* This case is recorded because of the difficulties attendant upon home deliveries twenty years ago. The bleeding undoubtedly occurred because the placenta separated immediately and was not spontaneously delivered. Even today such cases of profuse hemorrhage can hardly have the benefit of transfusion or the advantage of intravenous medication. Had this patient continued to bleed the uterus undoubtedly would have been packed. Fortunately, added hemorrhage was not encountered, the uterus shut down adequately, and like

most cases of shock alone, recovery was spontaneous.

Those of us who now do all our obstetrics in the hospital where modern facilities are available and where there are always plenty of hands to help cannot appreciate the difficulties and embarrassments of complicated home deliveries unless we are old enough to remember them. Undoubtedly, there are patients each year in Massachusetts who, confined at home, die of postpartum hemorrhage simply because the facilities of the modern hospital are not available. Some of the complications of obstetrics can be prepared for beforehand. Postpartum hemorrhage from uterine atony cannot be anticipated, and it is certainly not at all feasible to have the home equipped to meet this emergency, in consequence, hospitalization should be entertained whenever possible.

### LEGISLATIVE NOTE

The chiropractic bill, now before the Committee on Public Health, has been given a number, House Bill 2151.

The people who favor this bill have been particularly active this year, and we strongly urge each member of the Society to write to his senator, his representative and members of the Committee on Public Health asking them to oppose it. The hearing will be held at 10.30 a. m., April 25, in the Gardner Auditorium. BE SURE TO COME, AND BRING YOUR FRIENDS!

CHARLES C LUND, *Chairman*  
Committee on State and  
National Legislation

### MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 24.

#### BERKSHIRE

Thursday, April 27, at 4.30 p. m., at the House of Mercy Hospital, Pittsfield. Subject—The Control and Treatment of Respiratory Infections. (This is to include the serological treatment of pneumonia in infants and children.) Instructor John A. V. Davies. Melvin H. Walker, Jr., *Chairman*.

#### FRANKLIN

Wednesday, April 26 at 8.00 p. m., at the Franklin County Public Hospital, Greenfield. Subject—Gonorrhea. Modern treatment of gonorrhea. Instructor Sylvester B. Kelley. Halbert G. Stetson, *Chairman*.

In spite of the strong arguments in the minority report on chiropractic, it remains the report of a minority, and as such, carries less weight, although the commission was unanimous against a separate board for osteopathy. The lesson to be learned from this report is that physicians must ever be alert to detect efforts to lower the standards for the practice of medicine and must constantly exert themselves to prevent such degradation.

## ILLUSION AND SCIENCE

MODERN science is characterized by a quality shown in William Harvey's investigations which led to his discovery of the circulation of the blood. He asked a critical question, *How much* blood is thrown out of the heart at each contraction? Today science asks insistently these questions: How many? How much? Mathematics, although it cannot be comprehended within the designation of the science of quantity, has served as an effective model for the approximately precise sciences of inanimate nature. It presents an ideal which the sciences of animate nature strive to realize. As some of the words or formulas are transferred to the social sciences, there is created an illusion of attainable exactitude and precision, dangerous because it is so far from actual knowledge.

A recent paper by Mr. Michael M. Davis,\* entitled "Nursing Service Measured by Social Needs," is an example of this illusion, widespread in many social studies. The limitations of the value of statistics are well known to the expert and it is the disregard of these limitations which has led to the characterization of statistics as untruth of superlative degree. *Corruptio optimi pessimum*.

The purpose of the study was to obtain exact information concerning nursing service and methods of determining its quantitative and qualitative adequacy. This is indeed a social need. The writer uses the expression "yardsticks of both quantity and quality," and an example of the reasoning which leads to the "therefore" of his conclusions is given by the following quotation, in which the words in brackets are our own. It is a piece

of reasoning invalidated by a premise which is admitted early and then treated as if it did not exist. "If we make an estimate of the amount of nursing care actually furnished, we do not find a reliable body of data [in logic the argument must stop if no reliable data are available, but not so in social science], but roughly from the known amount of unemployment of nurses in private duty and the amount of work done by salaried visiting nurses, it may be [unreliably] estimated that about one-fifth day's nursing care per capita of our population is now supplied the people of the United States outside of hospitals. If this figure is reliable [which it is not, *ex hypothesi*], the amount of nursing now supplied outside of hospitals is about 40 per cent of the amount needed. If we had for each state and for many local communities such [unreliable] yardsticks of public need as compared with services rendered, we should be much farther along in judging what should be done, and where and how."

It is unfortunate that a plea for more science should be supported by unscientific argument. This kind of reasoning is indeed the strongest plea, unconscious perhaps on the part of the writer, for release from illusion and a return to the sanity which the word yardstick denotes but does not make real. Whatever other social needs there may be, one fundamental urgent need is restraint within the confines of logical discourse in dealing with our vital problems.

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

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Boston

#### POSTPARTUM HEMORRHAGE

Mrs. H., a twenty-seven-year-old gravida III, at term, was seen at home in labor on the evening of September 10, 1922.

The family history was noncontributory. The pa-

\*Davis, M. M. Nursing service measured by social needs. *Am J Nursing* 39:35-40, 1939.

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

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University of Wisconsin Medical School, 1934

## MIDDLESEX SOUTH

Tuesday, April 25, at 4 30 p m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge.  
Subject—Syphilis Latent syphilis—diagnosis and treatment. Instructor C Guy Lanc Alexander A Levi, *Chairman*

## SUFFOLK

Thursday, April 27, at 4 30 p m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston.  
Subject—Anemia Modern methods, diagnosis and treatment. Instructor William P Murphy Reginald Fitz, *Chairman*

DIAS, JOHN F, JR., 361 County Street, New Bedford.  
Tufts College Medical School, 1935

HARNEX, ALOYSIUS P, 167 Washington Street, New Bedford.

Harvard Medical School, 1934

HORAN, GEORGE R., 560 Broadway, Fall River  
Georgetown University Medical School, 1935

MUNCE, RICHARD T, Truesdale Hospital, Fall River  
Harvard Medical School, 1935

PRIAL, DAVID, 104 East Main Street, Fall River  
St. Louis College of Physicians and Surgeons, 1926

Albert H Sterns, *Secretary*

## APPLICANTS FOR FELLOWSHIP

PUBLISHED IN ACCORDANCE WITH THE PROVISIONS OF THE  
BY-LAWS (CHAPTER I, SECTION 1) AS AMENDED JUNE 2,  
1938

## BARNSTABLE DISTRICT

DELLA, ARTHUR J, South Chatham  
Tufts College Medical School, 1933

NILES, JOHN O, Third Avenue, Osterville.  
Harvard Medical School, 1936

RICE, JACKSON M, Hyannis  
Middlesex College of Medicine and Surgery, 1932

Donald E Higgins, *Secretary*

## BERKSHIRE DISTRICT

ALLEN, PLINY A., 83 Chestnut Street, North Adams  
Harvard Medical School, 1934

CHESANOW, ALBERT, 133 Castle Street, Great Barrington.  
Middlesex College of Medicine and Surgery, 1928

HAGOPIAN, LEON G, 1171st Co, CCC, North Adams  
Tufts College Medical School, 1911

HOWARD, JAMES H., St. Luke's Hospital, Pittsfield  
University of Vermont College of Medicine, 1936

NESBIT, CLAYTON W, 79 Lenox Avenue, Pittsfield  
Harvard Medical School, 1936

WYMAN, EDWARD R., 244 Main Street, Great Barrington  
Tufts College Medical School, 1937

Hugh J Downey, *Secretary*

## BRISTOL NORTH DISTRICT

GILLIS, GRACE E, State Hospital, Taunton.  
Tufts College Medical School, 1937

PRINDLE, CLAIR G, State Hospital, Taunton  
Temple University School of Medicine, 1937

William H Swift, *Secretary*

## BRISTOL SOUTH DISTRICT

BARRETT, JAMES A, 7 Middle Street, South Dartmouth  
Maryland Medical College, 1910

COSGROVE, THOMAS C, Main Street, Vineyard Haven.  
College of Physicians and Surgeons, Boston, 1923

DE MELLO, JOSEPH, 40 Bliss Street, South Dartmouth  
Tufts College Medical School, 1935

## ESSEX NORTH DISTRICT

HUMPHREYS, STORER P, 155 High Road, Newbury  
Yale University School of Medicine, 1932

MACLEOD, DOROTHY G, 60 High Street, Newburyport.  
Tufts College Medical School, 1924

SZOSTAK, RAYMOND G, 250 Prospect Street, Lawrence.  
Kansas City University of Physicians and Surgeons,  
1931

Elmer S Bagnall, *Secretary*

## ESSEX SOUTH DISTRICT

BABB, WARREN D, 40 Chestnut Street, Salem.  
McGill University Faculty of Medicine, 1936

CARROLL, WILLIAM J, Essex Sanatorium, Middleton.  
Tufts College Medical School, 1935

CUNNEY, JOHN V, 11½ Fowler Street, Salem.  
Harvard Medical School, 1935

GINSBERG, MAX, 314 Essex Street, Salem  
Tufts College Medical School, 1933

JANNINO, EDMUND A., 843 Western Avenue, Lynn  
Middlesex College of Medicine and Surgery, 1933

LARCHEZ, HENRY F, Walnut Road, South Hamilton.  
Middlesex College of Medicine and Surgery, 1932

OBBERSON, HENRY J, 93 Eastern Avenue, Lynn  
Harvard Medical School, 1932

REMILLARD, FLORA M., Danvers State Hospital, Hathorne.  
University of Vermont College of Medicine, 1934

RICHARDSON, RUSSELL R., 81 Highland Avenue, Salem.  
Indiana University School of Medicine, 1933

SPECTOR, NATHAN M., 8 Gray Circle, Lynn.  
Tufts College Medical School, 1924

TODD, BARNARD P, Beverly Hospital, Beverly  
Harvard Medical School, 1936

WATTS, WINTHROP F, 2 Brookhouse Drive, Marblehead.  
New York University College of Medicine, 1937

J Robert Shaughnessy, *Secretary*

## FRANKLIN DISTRICT

FOOTNICK, SAMUEL, 30 East Main Street, Orange.  
Middlesex College of Medicine and Surgery, 1930

KAYE, EDWARD, Mount Hermon.  
Cornell University Medical College, 1936

MOLOTCHICK, MAXWELL B, 29 Bridge Street, Millers Falls.  
Middlesex College of Medicine and Surgery, 1928

Charles Moline, *Secretary*

WOODWARD, APPLETON C, Norfolk County Hospital, South Braintree.

Tufts College Medical School, 1937

Robert L. Cook, *Secretary*

#### PLYMOUTH DISTRICT

CARR, WILLIAM M, 463 Washington Street, Whitman.  
Tufts College Medical School, 1935

GIBERTI, JOSEPH V, 31 Oak Street, Middleboro  
Tufts College Medical School, 1937

POLLEN, DAVID A., 24 School Street, Middleboro  
Middlesex College of Medicine and Surgery, 1932

RAGONETTI, VICTOR V, 145 Court St., Plymouth  
Middlesex College of Medicine and Surgery, 1931

Howard C. Reed, *Secretary*

#### SUFFOLK DISTRICT

BUTTS, VINCENT, 244 Meridian Street, East Boston  
Kansas City University of Physicians and Surgeons,  
1928

CASSIN, BENJAMIN I, 195 Chestnut Street, Chelsea  
Tufts College Medical School, 1931

EDWARDS, JESSE E., 21 Worcester Square, Boston  
Tufts College Medical School, 1935

GERSH, DAVID H., Carney Hospital, South Boston  
Tufts College Medical School, 1937

GINSBURG, ENANUEL, 20 Garden Street, Boston  
Tufts College Medical School, 1933

GLUCCIARIELLO, COSMO A., 131 Endicott Street Boston  
Royal University of Rome, 1935

MALOOF, FREDERIC, 22 East Brookline Street, Boston.  
Middlesex College of Medicine and Surgery, 1931

MANSFIELD, JAMES S., 33 Commonwealth Avenue, Boston.  
Harvard Medical School, 1932

MAVRIDES, WILLIAM P., 194 Huntington Avenue, Boston  
University of Vermont College of Medicine, 1933

McMANUS, JOHN F., 818 Harrison Avenue, Boston.  
Boston University School of Medicine, 1936

QUIGLEY, THOMAS B., 24 Peterboro Street, Boston.  
Harvard Medical School, 1933

ROIFF, HARRY S., 159 Shurtleff Street, Chelsea.  
St. Louis College of Physicians and Surgeons, 1923

ROSS, MICHAEL M., 497 Broadway, South Boston.  
Boston University School of Medicine, 1937

SMITH, JOSEPH T., 261 Beacon Street, Boston  
Johns Hopkins University School of Medicine, 1907

THIBODEAU, ARTHUR A., 77 Park Drive, Boston.  
Tufts College Medical School, 1932

ZOLLO, FELICE J., 353 Revere Street, Revere.  
Middlesex College of Medicine and Surgery, 1928

John P. Monks, *Secretary*

#### WORCESTER DISTRICT

CICCHETTI, JOHN R., 19 Church Street, Milford  
St. Louis University School of Medicine, 1934

CORRADO, AGOSTINO L., 4 Park Street, Webster  
Long Island College of Medicine, 1933

D'ARGENTIS, ITALIA M., 22 Gage Street, Worcester  
Middlesex College of Medicine and Surgery, 1929

DYER, CHARLES, Worcester City Hospital, Worcester  
Tufts College Medical School, 1937

HOSTETTLER, CLEON W., 47 Summer Street, North Brook  
field  
Middlesex College of Medicine and Surgery, 1933

LORGE, HEINZ, Rutland State Sanatorium, Rutland.  
Johann Wolfgang Goethe Universität Medical Faculty,  
1933

NELSON, RICHARD W., Grafton State Hospital, North Graf  
ton.  
McGill University Faculty of Medicine, 1935

RENDER, NORMAN D., Worcester State Hospital, Worcester  
McGill University Faculty of Medicine, 1928

ROBINSON, ROGER W., 27 Elm Street, Worcester  
Northwestern University Medical School, 1935

RUSSELL, FRANK H., 78 Burncoat Street, Worcester  
University of Tennessee College of Medicine, 1917

WATSON, WILFRED M., Memorial Hospital, Worcester  
Tufts College Medical School, 1937

WEIKSNER, FRANCIS A., 67 Providence Street, Worcester  
Middlesex College of Medicine and Surgery, 1929

George C. Tully, *Secretary*

#### WORCESTER NORTH DISTRICT

GROSSMAN, MYER J., 599 Main Street, Athol.  
Middlesex College of Medicine and Surgery, 1933

HAINES, SOLOMON M., Gardner State Hospital, East Gard  
ner  
Jefferson Medical College of Philadelphia, 1932

MATTIA, ANTHONY F., 97 Summer Street, Fitchburg  
College of Physicians and Surgeons, Boston, 1921

WASSER, LOUIS, Elm Street, Baldwinsville.  
Middlesex College of Medicine and Surgery, 1933

Edward A. Adams, *Secretary*

#### DEATHS

HART — CLARENCE D. HART, M.D., of Somerville, died April 9 in Savannah, Georgia. He was in his forty fifth year.

Dr. Hart received his degree from the Albany Medical College, New York, in 1931, and also attended Harvard Medical School. He had specialized in public health and had recently been appointed to serve as health officer of Savannah.

Dr. Hart was a member of the Massachusetts Medical Society and the American Medical Association.

His father survives him.

LYNCH — CHARLES E. LYNCH, M.D., of Quincy, died April 13. He was in his forty second year.

Born in South Boston he received his degree from Tufts College Medical School in 1923. He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, a son, a daughter, four sisters and a brother, Dr. James Lynch, survive him.

- BELL, BENJAMIN, 11 Crawford Street, Roxbury  
Jefferson Medical College of Philadelphia, 1936
- BICCHIERI, NUNZIO A., 474 Canterbury Street, Dorchester  
St. George's Hospital Medical School, 1935
- BRUCE, NORMAN H., Pondville Hospital, Wrentham  
Harvard Medical School, 1934
- CHAPMAN, CARRIE E., 301 Chestnut Avenue, Jamaica Plain.  
Tufts College Medical School, 1934
- CHASE, LOUIS S., 453 Washington Street, Brookline  
University of Berlin, Germany, 1934
- CONNOR, JOHN H. F., Emerald Street, Wrentham.  
College of Physicians and Surgeons, Boston, 1907
- CRONAN, BERNARD P., 40 Pond Street, Sharon  
University of Kansas City, 1933
- DILLON, RAYMOND A., 97 Sewall Avenue, Brookline  
Harvard Medical School, 1938
- DI RAGO, JOSEPH V., 44 York Terrace, Brookline  
Middlesex College of Medicine and Surgery, 1933
- DROOKER, JOSHUA C., 15 Stratton Street, Dorchester  
Tufts College Medical School, 1933
- DUCKERING, FLORENCE A., 4238 Washington Street, Roslindale.  
Tufts College Medical School, 1937
- DUNPHY, JOHN E., 2 Netherlands Road, Brookline  
Harvard Medical School, 1933
- FELDMAN, THEODORE, Robert Breck Brigham Hospital, Roxbury  
Tufts College Medical School, 1935
- FLYNN WILLIAM F., 307 Edge Hill Road, Milton.  
Yale University School of Medicine, 1933
- GASSON, ANTHONY W., 937 Washington Street, Norwood  
Middlesex College of Medicine and Surgery, 1934
- GLODT, MILTON, 19 Thatcher Street, Brookline  
University of Basel, Switzerland, 1936
- GORMAN, LIONEL J., 364 Riverway, Roxbury  
Massachusetts College of Osteopathy, 1926  
Middlesex College of Medicine and Surgery, 1932
- GROSS, ROBERT E., Peter Bent Brigham Hospital, Roxbury  
Harvard Medical School, 1931
- HAMLIN, EDWARD, JR., 1031 Brush Hill Road, Milton  
Harvard Medical School, 1933
- HARRISON, JAMES, 917 West Roxbury Parkway, Brookline.  
Boston University School of Medicine, 1937
- HARRISON, JOHN H., 8 Brewster Terrace, Brookline  
University of Virginia Department of Medicine, 1932.
- HISCOCK, MABELLE C., New England Hospital for Women and Children, Roxbury  
Johns Hopkins University School of Medicine, 1935
- HOFFMANN, RICHARD, 7 Egmont Street, Brookline  
University of Vienna, 1920
- HOGAN, JOSEPH N., 39 South Street, Jamaica Plain  
College of Physicians and Surgeons, Boston, 1928
- KEVORKIAN, ALBERT Y., 47 Crehore Road, Chestnut Hill  
Tufts College Medical School, 1934
- LEVIN, ORRIN, 1037 Beacon Street, Brookline  
Tufts College Medical School, 1935
- LEVINS, LEO V., 128 Longwood Avenue, Brookline.  
Tufts College Medical School, 1936
- LUZACKAS, PAULINE, New England Hospital for Women and Children, Roxbury  
Boston University School of Medicine, 1937
- MATAROZZO, MARY K. D., 257 Belgrade Avenue, Roslindale.  
Tufts College Medical School, 1924
- MORIARTY, JAMES E., 1074 South Street, Roslindale.  
Middlesex College of Medicine and Surgery, 1933
- NORTON, HAROLD F., 340 Canterbury Street, Dorchester  
Harvard Medical School, 1931
- OFFENBACH, BERTHA, 9 Woodville Street, Roxbury  
Boston University School of Medicine, 1936
- REIDY, JOHN A., 92 High Street, Brookline.  
Harvard Medical School, 1934
- SCHEIDELL, DOROTHY K., New England Hospital for Women and Children, Roxbury  
Cornell University Medical College, 1932
- SOLET, LEO, 280 Main Street, Franklin  
Middlesex College of Medicine and Surgery, 1933
- SULLIVAN, DANIEL J., Boston State Hospital, Dorchester Center  
Temple University School of Medicine, 1934
- SULLIVAN, JOHN F., Boston State Hospital, Dorchester Center  
Boston University School of Medicine, 1937
- VICKERY, EUGENE A., 6 Kenilworth Road, Wellesley  
Harvard Medical School, 1903
- WAGMAN, ORA H., 382 Riverway, Roxbury  
Tufts College Medical School, 1937
- WELCH, EDWARD J., 20 Laurel Road, Milton  
Harvard Medical School, 1936
- ZALVAN, JACOB, 64 North Street, Medfield.  
Middlesex College of Medicine and Surgery, 1934
- ZETLIN, ARNOLD, 72 Egmont Street, Brookline.  
Tufts College Medical School, 1936
- Frank S. Cruickshank, *Secretary*
- 
- NORFOLK SOUTH DISTRICT
- AMIRHEIN, LEO F., 774 Hancock Street, Quincy  
Tufts College Medical School, 1935
- BOZIGIAN, HAIG, Quincy City Hospital, Quincy  
Tufts College Medical School, 1938
- CAREY, EDMUND L., 59 South Street, Quincy  
Tufts College Medical School, 1935
- DALTON, KENNETH V., 133 Washington Street, Weymouth.  
Tufts College Medical School, 1936
- DELLA, VINCENT, Quincy City Hospital, Quincy  
Tufts College Medical School, 1937
- FOX, LESTER I., Quincy City Hospital, Quincy  
University of Maryland School of Medicine and College of Physicians and Surgeons, 1938
- LEVIN, AARON H., Quincy City Hospital, Quincy  
Tufts College Medical School, 1937
- LINDBLADE, ERIC H., 49 Whitney Road, Quincy  
Tufts College Medical School, 1919
- MILLEN, MORRIS H., 391 Bridge Street, North Weymouth.  
Middlesex College of Medicine and Surgery, 1933
- SHERMAN, JULIUS, Quincy City Hospital, Quincy  
Tufts College Medical School, 1938
- TAYLOR, MORRIS, Quincy City Hospital, Quincy  
Boston University School of Medicine, 1938
- WALSH, FRANCIS X., Quincy City Hospital, Quincy  
Tufts College Medical School, 1937



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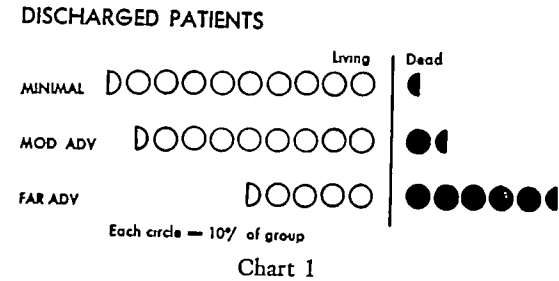
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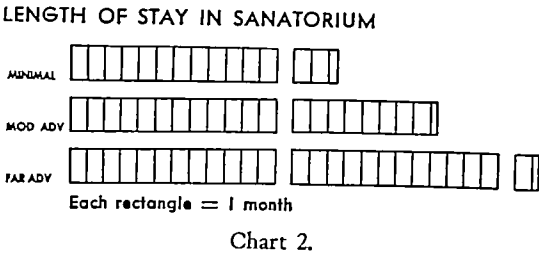
MISCELLANY

STAGE OF TUBERCULOSIS  
INFLUENCES PROGNOSIS

Hilleboe (Follow up study of patients discharged from tuberculosis sanatoria *Transactions of the Thirty-Fourth Annual Meeting of the National Tuberculosis Association, 1938*) succeeded in tracing 927 per cent of more than 5000 patients discharged from ten of the fifteen public tuberculosis sanatoriums in Minnesota during the ten year period, 1926-1935. Patients studied were about equally divided between rural and urban residents. Of the total number about 36 per cent were dead on discharge. This tremendous loss gives some measure of the tragic toll taken by this disease even during hospitalization when expert medical attention and every facility for treatment are available. Living and dead are classified, according to stage of disease, as shown approximately in Chart 1



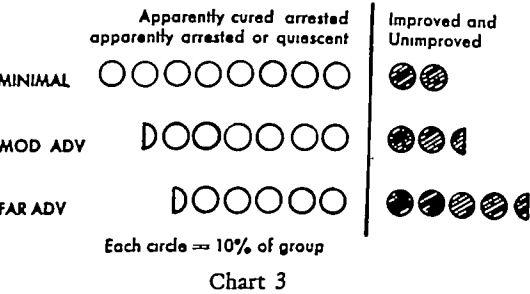
Stage of disease influences the length of time needed for recovery. In this study all patients were in the sanatorium for ninety days or more. Living patients, not including those who were admitted more than once were



classified according to the average length of stay in the sanatorium and the stage of the disease. Chart 2 pictures roughly the result.

The influence of stage of disease on the condition at the

CONDITION ON DISCHARGE



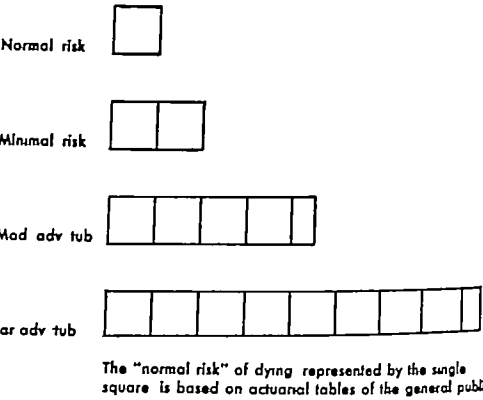
time of discharge was studied and the results confirmed the observation that the early case has a much better

chance of satisfactory recovery than has the advanced case. The result is summarized in Chart 3

The probabilities of dying from any given disease can be calculated by actuaries with a fair degree of accuracy. In a person with tuberculosis the risk of dying is increased and this risk is in direct ratio to the stage of disease as shown in Chart 4

"Statistical study of comparative mortality in discharged patients gives valid proof of the soundness of many clinical concepts regarding the disease. After all, one of the real values of statistics is to confirm the impressions of

RISK OF DYING INCREASED BY TUBERCULOSIS



sound clinicians. Beneficial effects of early diagnosis of serious pulmonary tuberculosis lesions are reflected in the smaller risk of dying on the part of the minimal cases in comparison with the more advanced cases during the dangerous first five years after discharge. Tuberculosis must be diagnosed early — Reprinted from *Tuberculosis Abstracts*, April, 1939

RÉSUMÉ OF COMMUNICABLE DISEASES  
IN MASSACHUSETTS FOR FEBRUARY, 1939

DISEASES	FEB 1939	FEB 1938	FIVE YEAR AVERAGE*
Anterior poliomyelitis	0	0	0
Chickenpox	1347	1607	1325
Diphtheria	12	10	25
Dog bite	580	510	492
Dysentery bacillary	23	6	2
German measles	66	80	509
Gonorrhea	285	444	409
Lobar pneumonia	616	519	661
Measles	3825	811	3504
Meningococcus meningitis	7	8	11
Mumps	823	777	900
Paratyphoid B fever	2	1	0
Scarlet fever	899	1211	1000
Syphilis	343	462	425
Tuberculosis, pulmonary	164	141	221
Tuberculosis other forms	15	23	28
Typhoid fever	5	3	5
Undulant fever	2	3	2
Whooping cough	1015	454	957

Based on figures for preceding five years.

RARE DISEASES

*Diphtheria* was reported from Athol, 1, Cambridge, 2, Haverhill, 1, Lawrence, 7, North Adams, 1, total, 12.  
*Dysentery, bacillary*, was reported from Danvers, 2, Lowell, 6, Wrentham, 15, total, 23.  
*Infectious encephalitis* was reported from Chicopee, 1, Westfield, 1, total, 2.  
*Meningococcus meningitis* was reported from Boston, 2, Leominster, 1, Lynn, 1, Newton, 1, Randolph, 1, Somerville, 1, total, 7.

*Paratyphoid B fever* was reported from Brookline, 1, West Springfield, 1, total, 2

*Pellagra* was reported from Westminster, 1, total, 1  
*Pfeiffer bacillus meningitis* was reported from Greenfield, 1, Lowell, 1, Springfield, 1, total, 3

*Septic sore throat* was reported from Boston, 5, Chelsea, 1, Fall River, 2, Frammingham, 1, Greenfield, 1, Lawrence, 1, Lowell, 1, Lynn, 1, Malden, 2, New Bedford, 2, Quincy, 1, Somerville, 1, Woburn, 2, total, 21

*Trichinosis* was reported from Boston, 1, Springfield, 1, total, 2

*Typhoid fever* was reported from Boston, 1, Brookline, 1, Everett, 1, Lynn, 1, Plymouth, 1, total, 5

*Undulant fever* was reported from Andover, 1, Barnstable, 1, total, 2

Whooping cough, measles, chickenpox, and paratyphoid B fever were reported above the five-year average.

Scarlet fever, diphtheria, mumps and German measles were reported below the five year average.

Tuberculosis (other forms) showed record low figures for the second consecutive month.

Lobar pneumonia, meningococcus meningitis and pulmonary tuberculosis were reported below the five year average.

Typhoid fever and undulant fever were reported at figures equal to that of the five year average.

Animal rabies showed record low incidence for the third consecutive month. A new focus was noted in Woburn

## MAINE NEWS

### THE WOMEN'S FIELD ARMY

Plans for the 1939 campaign of the Women's Field Army of Maine are being completed under the direction of the Volunteer Campaign Committee consisting of Mr Samuel Stewart, of Lewiston, chairman, Mrs. John H. Huddleston, of Orono, Mrs. William Holt, of Portland, Dr Frederick T Hill, of Waterville, and Dr Edward H. Risley, of Waterville, chairman of the Advisory Board, ex officio

April has been designated as Cancer-Control Month by the American Society for the Control of Cancer. The intensive campaign will be carried on in most communities in Maine during the week of April 3, although the entire month will be given over to the work for the benefit of those groups which cannot carry on their campaign during the first week. Continuing the fine co-operation of the medical profession with the Women's Field Army, ninety-eight physicians, representing all counties of the State, have accepted chairmanships of advisory boards in their various sections

Figures compiled at headquarters show the scope of the service given in 1938 through the Dr Joseph W Scannell Memorial Fund. Every county is represented by patients treated from May to October, 1938, when, because of the increasing demand for free treatment, the funds became exhausted. As Maine has no hospital for the free treatment of the indigent cancer patient, this service of the Women's Field Army has been a great boon to the 194 needy patients treated by either radium or x rays

### POSTGRADUATE EDUCATION

The Committee on Graduate Education has prepared the following panel discussions which are now available for county medical society meetings

Pneumonia—Dr F T Hill, Waterville, chairman.

Cardiovascular Disease—Dr E E. Holt, Jr, Portland, chairman.

Laboratory Procedures and Their Relation to Clinical Medicine—Dr Julius Gottlieb, Lewiston, chairman

The Acute Surgical Abdomen—Dr F H. Jackson, Houlton, chairman.

Fractures—Dr Allan Woodcock, Bangor, chairman.

### ANTI-PNEUMOCOCCUS SERUM

The following facts relative to the availability of therapeutic serum in the different types of pneumonia have been recently announced by the State Board of Health and Welfare.

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Serum is supplied free to indigent patients, those who can pay will be billed at cost. Relatives or neighbors should transport the specimens. Regular messenger service is not available in Augusta, and such transportation is not a regular function of the State Police.

### NOTES

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## CORRESPONDENCE

### ADMISSIONS TO STATE BOARD EXAMINATIONS

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STEPHEN RUSHMORE, M.D., Secretary  
Board of Registration in Medicine,  
State House, Boston.

MISCELLANY

STAGE OF TUBERCULOSIS  
INFLUENCES PROGNOSIS

Hilleboe (Follow up study of patients discharged from tuberculosis sanatoria *Transactions of the Thirty-Fourth Annual Meeting of the National Tuberculosis Association, 1938*) succeeded in tracing 927 per cent of more than 5000 patients discharged from ten of the fifteen public tuberculosis sanatoriums in Minnesota during the ten year period, 1926-1935. Patients studied were about equally divided between rural and urban residents. Of the total number about 36 per cent were dead on discharge. This tremendous loss gives some measure of the tragic toll taken by this disease even during hospitalization when expert medical attention and every facility for treatment are available. Living and dead are classified, according to stage of disease, as shown approximately in Chart 1.

DISCHARGED PATIENTS

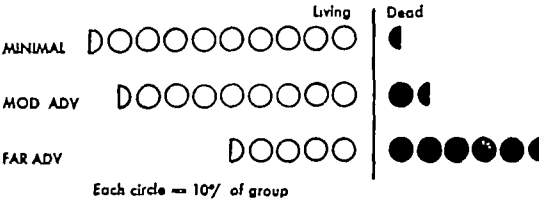


Chart 1

Stage of disease influences the length of time needed for recovery. In this study all patients were in the sanatorium for ninety days or more. Living patients, not including those who were admitted more than once were

LENGTH OF STAY IN SANATORIUM

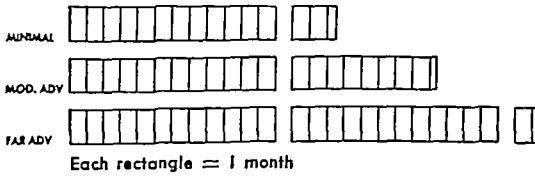


Chart 2

classified according to the average length of stay in the sanatorium and the stage of the disease. Chart 2 pictures roughly the result.

The influence of stage of disease on the condition at the

CONDITION ON DISCHARGE

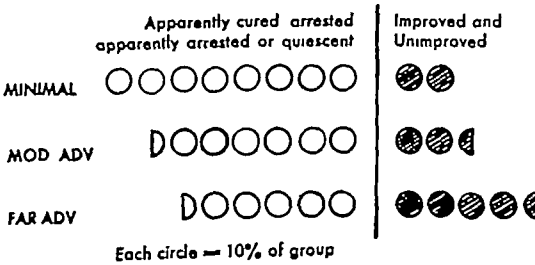


Chart 3

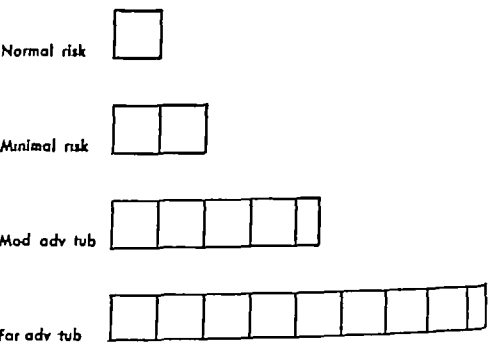
time of discharge was studied and the results confirmed the observation that the early case has a much better

chance of satisfactory recovery than has the advanced case. The result is summarized in Chart 3.

The probabilities of dying from any given disease can be calculated by actuaries with a fair degree of accuracy. In a person with tuberculosis the risk of dying is increased and this risk is in direct ratio to the stage of disease as shown in Chart 4.

'Statistical study of comparative mortality in discharged patients gives valid proof of the soundness of many clinical concepts regarding the disease. After all, one of the real values of statistics is to confirm the impressions of

RISK OF DYING INCREASED BY TUBERCULOSIS



The "normal risk" of dying represented by the single square is based on actuarial tables of the general public.

Chart 4

sound clinicians. Beneficial effects of early diagnosis of serious pulmonary tuberculosis lesions are reflected in the smaller risk of dying on the part of the minimal cases in comparison with the more advanced cases during the dangerous first five years after discharge. Tuberculosis must be diagnosed early' — Reprinted from *Tuberculosis Abstracts*, April, 1939.

RÉSUMÉ OF COMMUNICABLE DISEASES  
IN MASSACHUSETTS FOR FEBRUARY, 1939

DISEASES	FEB 1939	FEB 1938	FIVE YEAR AVERAGE*
Anterior poliomyelitis	0	0	0
Chickenpox	1347	1607	1325
Diphtheria	12	10	25
Dog bite	580	510	492
Dysentery bacillary	23	6	2
German measles	66	80	509
Gonorrhea	285	444	409
Lobar pneumonia	616	519	661
Measles	3825	811	3504
Meningococcus meningitis	7	8	11
Mumps	823	777	900
Paratyphoid B fever	2	1	0
Scarlet fever	899	1211	1000
Syphilis	343	462	425
Tuberculosis pulmonary	164	141	221
Tuberculosis other forms	15	23	28
Typhoid fever	5	5	2
Undulant fever	2	3	2
Whooping cough	1015	454	957

Based on figures for preceding five years.

RARE DISEASES

*Diphtheria* was reported from Athol, 1, Cambridge, 2, Haverhill, 1, Lawrence, 7, North Adams, 1, total, 12.  
*Dysentery, bacillary*, was reported from Danvers, 2, Lowell, 6, Wrentham, 15, total, 23.  
*Infectious encephalitis* was reported from Chicopee, 1, Westfield, 1, total, 2.  
*Meningococcus meningitis* was reported from Boston, 2, Leominster, 1, Lynn, 1, Newton, 1, Randolph, 1, Somerville, 1, total, 7.

*Paratyphoid B fever* was reported from Brookline, 1, West Springfield, 1, total, 2

*Pellagra* was reported from Westminster, 1, total, 1

*Pfeiffer bacillus meningitis* was reported from Greenfield, 1, Lowell, 1, Springfield, 1, total, 3

*Septic sore throat* was reported from Boston, 5, Chelsea, 1, Fall River, 2, Framingham, 1, Greenfield, 1, Lawrence, 1, Lowell, 1, Lynn, 1, Malden, 2, New Bedford, 2, Quincy, 1, Somerville, 1, Woburn, 2, total, 21

*Trichinosis* was reported from Boston, 1, Springfield, 1, total, 2.

*Typhoid fever* was reported from Boston, 1, Brookline, 1, Everett, 1, Lynn, 1, Plymouth, 1, total, 5

*Undulant fever* was reported from Andover, 1, Barnstable, 1, total, 2

Whooping cough, measles, chickenpox, and paratyphoid B fever were reported above the five-year average.

Scarlet fever, diphtheria, mumps and German measles were reported below the five year average.

Tuberculosis (other forms) showed record low figures for the second consecutive month

Lobar pneumonia, meningococcus meningitis and pulmonary tuberculosis were reported below the five year average.

Typhoid fever and undulant fever were reported at figures equal to that of the five-year average.

Animal rabies showed record low incidence for the third consecutive month. A new focus was noted in Woburn

## MAINE NEWS

### THE WOMEN'S FIELD ARMY

Plans for the 1939 campaign of the Women's Field Army of Maine are being completed under the direction of the Volunteer Campaign Committee consisting of Mr Samuel Stewart, of Lewiston, chairman, Mrs John H. Huddleston, of Orono, Mrs William Holt, of Portland, Dr Frederick T Hill, of Waterville, and Dr Edward H. Risley, of Waterville, chairman of the Advisory Board, ex officio

April has been designated as Cancer-Control Month by the American Society for the Control of Cancer. The intensive campaign will be carried on in most communities in Maine during the week of April 3, although the entire month will be given over to the work for the benefit of those groups which cannot carry on their campaign during the first week. Continuing the fine co-operation of the medical profession with the Women's Field Army, ninety-eight physicians, representing all counties of the State, have accepted chairmanships of advisory boards in their various sections

Figures compiled at headquarters show the scope of the service given in 1938 through the Dr Joseph W Scannell Memorial Fund. Every county is represented by patients treated from May to October, 1938, when, because of the increasing demand for free treatment, the funds became exhausted. As Maine has no hospital for the free treatment of the indigent cancer patient, this service of the Women's Field Army has been a great boon to the 194 needy patients treated by either radium or x rays

### POSTGRADUATE EDUCATION

The Committee on Graduate Education has prepared the following panel discussions which are now available for county medical society meetings

Pneumonia—Dr F T Hill, Waterville, chairman  
Cardiovascular Disease—Dr E. E. Holt, Jr, Portland, chairman

Laboratory Procedures and Their Relation to Clinical Medicine—Dr Julius Gottlieb, Lewiston, chairman.

The Acute Surgical Abdomen—Dr F H. Jackson, Houlton, chairman.

Fractures—Dr Allan Woodcock, Bangor, chairman

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Winthrop Chemical Co, Inc.  
Tablets Suprarenin, 0.02 gm.

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,  
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## REPORT OF MEETING

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From this, one might conclude that the glomerulus is the *sine qua non* of kidney function, but there are certain fishes whose kidneys have no glomeruli. Similarly, in advanced Bright's disease one can demonstrate nephrons consisting of healthy tubules and no glomeruli. These tubules must necessarily do the secreting for the absent glomeruli, but since they cannot secrete and absorb at the same time, the latter function is given up, and the result is an unconcentrated urine. Proof positive of Bright's disease is a low, fixed specific gravity for hours or days. Casts, cells, albumin, and so forth, are not pathognomonic but merely incidental. Pathologically, in advanced Bright's disease the most striking finding in sections examined microscopically is atrophy of the tubules.

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a narrowing of the arterioles. Glomerulonephritis is a non suppurative inflammation, there are no foci of suppuration, and the lesion is so disseminated as to suggest the action of a diffusible toxin, nearly always of streptococcal origin, from the nose, throat or nasopharynx. However, two great groups of poisons can cause the lesion: crystalloids—chemicals—pass the glomerular filter so easily as not to harm it, but on concentration in the tubules the poison becomes strong enough to damage the tubular epithelium, colloids, such as bacterial toxins, are of much larger molecular size and are therefore concentrated in the glomerular filter and produce damage there. As a result of this, the power of the glomerulus to hold back colloids is lost and thus the toxins are allowed to pass on and produce secondary damage to the tubules.

In glomerulonephritis there is exudation but not suppuration. The glomerular tuft becomes far more cellular in appearance than normal, and this turns out, by differential staining, to be an endothelial proliferation. It is the first indication of the onset of ischemia, the loop narrows and eventually becomes occluded by hyaline thrombus formation. With the cutting off of blood supply, the filter is damaged and exudation of blood occurs into the glomerular space.

In hospital practice the sequence of events is not clearly seen because the patient's lifetime disease is often treated at various institutions. There are three stages: acute, subacute and chronic. In the acute stage the diffusible toxin in the circulation acts on all the glomeruli. As a rule the patient rarely dies at this stage but goes on to the next stage. Obviously, some of the glomeruli must recover, if the patient does, and the kidney sinks down and down only as recurring attacks take toll of the remaining ones. The patient who dies in the subacute stage has a large, white kidney, which is classically associated with the edematous, anemic patient. The kidney cortex is swollen, and there are doubly refractile lipid bodies in the epithelial cells. If the patient recovers from this stage, however, he goes on to the chronic stage, in which, post mortem, one sees loss of glomeruli, aglomerular tubules and a contracted kidney. Some healthy nephrons remain, which have carried the patient along, and these account for the gross picture of a nodular, scarred kidney. Microscopically, the striking thing is a disappearance of the normal number of renal tubules.

The other main type of Bright's disease is variously termed the arteriosclerotic, nephrosclerotic or hypertensive kidney, the essential lesion being thickening of the afferent arteriole and narrowing of its lumen so as to produce ischemia. Thus the same end result is obtained but by a different approach. This is the kidney of hypertension. Which is first, the hypertension or the arteriolar narrowing, is an academic question, Dr Boyd believes that hypertension is primary.

Dr Boyd made further comment on some of the principal symptoms of nephritis: (1) Albuminuria is the result of damage to the renal filter causing increase in its permeability. Tissue sections show this by the presence of coagulum in the capsular space. (2) Edema in the subacute stages is due to the failure of the osmotic pressure relations maintained by plasma colloids, which are lost in the urine. It is logical, therefore, that the first symptom be albuminuria, the second, edema. (3) Casts in the urine signify the large amount of albuminous material concentrated in the tubules so as to form molds. They incorporate whatever debris there is. (4) Inflammatory cells are present, of course, because this is an inflammation. Damaged epithelial cells are cast off. (5) With great damage and blocking, waste substances (nonprotein nitrogen)

# PRELIMINARY REPORT OF THE BOARD OF REGISTRATION IN MEDICINE ON ADMISSIONS TO MARCH, 1939, EXAMINATIONS

One hundred and ninety three candidates were examined. They can be arranged in three groups according to the school from which they graduated as follows: approved schools, non approved schools, osteopathic schools. Each group may be further subdivided into those taking the examination for the first time, those taking it for the second or third time, those taking it for the fourth or more time. Candidates who fail three times within one year must make out a new application which places them in the last group. Table 1 gives the figures in summary form.

TABLE 1

	APPROVED NORTH AMERICAN	FOR EIGH	NON APPROVED	OSTEO- PATHIC	TO- TAL
First examination	36	16	16	5	73
Second or third examination	0	8	65	12	85
Fourth or more examination	0	2	31	2	35
Totals	36	26	112	19	193

In Table 2 the number of times the applicants had taken their examinations is arranged according to the school from which they graduated. The order of the

TABLE 2

SCHOOL	FIRST EXAM- INA- TION	SECOND OR THIRD EXAM- INATION	FOURTH OR MORE EXAM- INATION	TO- TAL
Middlesex College of Medicine and Surgery	10	39	19	68
Kansas City University of Physicians and Surgeons	0	12	7	19
University of Rome	0	1	0	1
College of Physicians and Surgeons (Boston)	3	6	3	12
University of Naples	0	1	0	1
Mid West Medical College	1	7	2	10
Massachusetts College of Osteopathy	1	5	2	8
Syracuse University	1	0	0	1
Kirkville College of Osteopathy	3	5	0	8
Philadelphia College of Osteopathy	1	2	0	3
University of Vienna	8	1	0	9
Missouri College of Medicine and Science	0	1	0	1
University of Ghent	0	1	0	1
University of Munich	1	0	0	1
University of Tartu	0	1	0	1
University of Bonn	0	1	0	1
University of Berlin	1	1	0	2
Royal Colleges (Edinburgh)	0	1	0	1
Chicago Medical School	1	0	0	1
Boston University School of Medicine	3	0	0	3
University of Heidelberg	2	0	0	2
McGill University	2	0	0	2
Harvard Medical School	4	0	0	4
Columbia University	2	0	0	2
Tufts College Medical School	7	0	0	7
Hahnemann Medical School	1	0	0	1
New York University	1	0	0	1
University of Nebraska Medical School	1	0	0	1
Creighton University Medical School	1	0	0	1
University of Michigan	2	0	0	2
University of Lausanne	1	0	1	2
Washington University	1	0	0	1
University of Wurzburg	0	0	1	1
Fordham University Medical School	1	0	0	1
Marquette Medical School	1	0	0	1
University of Western Ontario	1	0	0	1
University of Prague	1	0	0	1
Rochester University	1	0	0	1
Des Moines Still College of Osteopathy	1	0	0	1
Emory Medical School	1	0	0	1

Northwestern University	2	0	0	2
Long Island Medical School	1	0	0	1
Bowdoin Medical School	1	0	0	1
University of Geneva	1	0	0	1
Jefferson University	1	0	0	1
University of Leipzig	1	0	0	1
Totals	73	85	35	193

schools is chronological according to the date on which the first graduate of each school filed application for this examination.

## COMMENT

There were in this examination no repeaters among the graduates of approved schools in the United States and Canada.

Of a total of 193 candidates examined, 120 were repeaters.

Of a total of 193 candidates examined, 112 were from non approved schools, reported as not eligible for admission to examination in any other state, and 19 osteopathic candidates for whom there are variations in the requirements of other states.

Of 52 graduates of approved schools taking the examination for the first time, 16 or about one third were from European universities (chiefly Continental).

## UNAUTHORIZED SPONSORSHIP

*To the Editor* I am informed that funds are being solicited for a 'Grand Ball to Fight Communism,' sponsored by a list to which my name and the names of other employees of the Boston Health Department are attached.

I know nothing of this affair and the use of my name is unauthorized.

FREDERICK J. BAILEY, M.D.,  
Deputy Health Commissioner

City Hall Annex,  
Boston

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of March 9 the following have been accepted:

Campbell Products, Inc.

Ampules Mercupurin, 1 cc.  
Ampules Mercupurin, 2 cc.

Eli Lilly & Co.

Ampules Solution Liver Extract Purified, 1 cc — Lilly,  
15 U.S.P. units per cc.

Sharp & Dohme

Sulfanilamide Tablets, 7½ gr

E. R. Squibb & Sons

Concentrated Antupneumococcic Serum — Squibb,  
Types 5 and 7

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	NORTH AMERICAN	FOR EXAMINATION	APPROVED	PATHIC	
First examination	36	16	16	5	73
Second or third examination	0	8	65	12	85
Fourth or more examination	0	2	31	2	35
Totals	36	26	112	19	193

In Table 2 the number of times the applicants had taken their examinations is arranged according to the school from which they graduated. The order of the

TABLE 2

SCHOOL	FIRST EXAMINATION	SECOND OR THIRD EXAMINATION	FOURTH OR MORE EXAMINATION	TOTAL
Middlesex College of Medicine and Surgery	10	39	19	68
Kansas City University of Physicians and Surgeons	0	12	7	19
University of Rome	0	1	0	1
College of Physicians and Surgeons (Boston)	3	6	3	12
University of Naples	0	1	0	1
Mid West Medical College	1	7	2	10
Massachusetts College of Osteopathy	1	5	2	8
Syracuse University	1	0	0	1
Kirkville College of Osteopathy	3	5	0	8
Philadelphia College of Osteopathy	1	2	0	3
University of Vienna	8	1	0	9
Missouri College of Medicine and Science	0	1	0	1
University of Ghent	0	1	0	1
University of Munich	1	0	0	1
University of Tartu	0	1	0	1
University of Bonn	0	1	0	1
University of Berlin	1	1	0	2
Royal Colleges (Edinburgh)	0	1	0	1
Chicago Medical School	1	0	0	1
Boston University School of Medicine	3	0	0	3
University of Heidelberg	2	0	0	2
McGill University	2	0	0	2
Harvard Medical School	4	0	0	4
Columbia University	2	0	0	2
Tufts College Medical School	7	0	0	7
Hahnemann Medical School	1	0	0	1
New York University	1	0	0	1
University of Nebraska Medical School	1	0	0	1
Creighton University Medical School	1	0	0	1
University of Michigan	2	0	0	2
University of Lausanne	1	0	1	2
Washington University	1	0	0	1
University of Wurzburg	0	0	1	1
Fordham University Medical School	1	0	0	1
Marquette Medical School	1	0	0	1
University of Western Ontario	1	0	0	1
University of Prague	1	0	0	1
Rochester University	1	0	0	1
Des Moines Sull College of Osteopathy	1	0	0	1
Emory Medical School	1	0	0	1

Northwestern University	2	0	0	2
Long Island Medical School	1	0	0	1
Bowdoin Medical School	1	0	0	1
University of Geneva	1	0	0	1
Jefferson University	1	0	0	1
University of Leipzig	1	0	0	1
Totals	73	85	35	193

schools is chronological according to the date on which the first graduate of each school filed application for this examination.

## COMMENT

There were in this examination no repeaters among the graduates of approved schools in the United States and Canada.

Of a total of 193 candidates examined, 120 were repeaters.

Of a total of 193 candidates examined, 112 were from non approved schools, reported as not eligible for admission to examination in any other state, and 19 osteopathic candidates for whom there are variations in the requirements of other states.

Of 52 graduates of approved schools taking the examination for the first time, 16 or about one third were from European universities (chiefly Continental).

## UNAUTHORIZED SPONSORSHIP

*To the Editor* I am informed that funds are being solicited for a 'Grand Ball to Fight Communism,' sponsored by a list to which my name and the names of other employees of the Boston Health Department are attached. I know nothing of this affair and the use of my name is unauthorized.

FREDERICK J. BAILEY, M.D.,  
Deputy Health Commissioner

City Hall Annex,  
Boston

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of March 9 the following have been accepted:

Campbell Products, Inc.

Ampules Mercupurin, 1 cc.  
Ampules Mercupurin, 2 cc.

Eli Lilly & Co.

Ampules Solution Liver Extract Purified, 1 cc. — Lilly,  
15 USP units per cc.

Sharp & Dohme

Sulfanilamide Tablets, 7½ gr

E. R. Squibb & Sons

Concentrated Antipneumococcic Serum — Squibb,  
Types 5 and 7

Concentrated Antipneumococcic Serum — Squibb,  
Types 4 and 8

The Upjohn Co.

Tablets Cinchophen, 5 gr  
Tablets Cinchophen, 7½ gr

Cambridge, on Wednesday, May 3 The business meeting will begin at 11 30 a. m. At noon the annual oration will be delivered by Dr Roy D Halloran on Opportunities of the Psychiatric Hospital in the Mental Health Problem.

Members in good standing are invited to the luncheon at 12 45 p. m.

FRED R. JOUETT, M.D., *President*,  
ALEXANDER A. LEVI, M.D., *Secretary*

## NEW ENGLAND SOCIETY OF PSYCHIATRY

The annual meeting of the New England Society of Psychiatry will be held at Kline Memorial Hall, Metropolitan State Hospital, Waltham, on Tuesday, April 25, at 12 o'clock noon. Inspection of the hospital will be followed by a luncheon and business meeting Dr John W Thompson and Dr William Corwin will speak on Some Observations on Patients Diagnosed as Having Schizophrenia.

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### PROGRAM

Back Strain Dr Claude L. Payzant.

Treatment of Flat Feet Dr Howard Moore.

Nerve Trauma Dr Gordon M. Morrison

Therapeutic Exercises in Bursitis of the Shoulder Lucy G Marshall

General discussion

All members of the medical profession are cordially invited to attend

WILLIAM D. MCFEE, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, APRIL 24

#### TUESDAY APRIL 25

9 10 a. m. Here and There in Endocrinology Dr Fuller Albright.  
Joseph H. Pratt Diagnostic Hospital

10 a. m. 12 30 p. m. Tumor clinic Boston Dispensary

5 p. m. Hospital Research Council. Ether Dome, Massachusetts General Hospital

8 15 p. m. Harvard Medical Society Amphitheater Peter Bent Brigham Hospital (Shattuck Street entrance)

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Joseph H. Pratt Diagnostic Hospital

12 m. Clinicopathological conference. Children's Hospital amphitheater

3 30 p. m. New England Society of Physical Medicine. Hotel Kenmore Boston

8 p. m. Sir William Osler Honor Society Middlesex University School of Medicine auditorium 415 Newbury Street Boston

8 15 p. m. Joint meeting of the Suffolk District Medical Society and the Boston Medical Library Boston Medical Library

#### THURSDAY APRIL 27

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3 30 p. m. Medical clinic at the Peter Bent Brigham Hospital

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\*4 p. m. New England Heart Association House of the Good Samaritan. 6 30 p. m. annual dinner Harvard Club 8 15 p. m. Boston Medical Library

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\*Open to the medical profession

APRIL 21—New England Roentgen Ray Society Page 619 issue of April 13

APRIL 21 and 22—New England Health Education Institute. Page 614 issue of April 6

APRIL 23—Health Lecture Quincy City Hospital Page 636 issue of February 23

APRIL 25—Harvard Medical Society Page 649 issue of April 13

APRIL 25—New England Society of Psychiatry Notice above

APRIL 25—Hospital Research Council Page 688

APRIL 26—Sir William Osler Honor Society Page 688

APRIL 26—New England Society of Physical Medicine. Notice above

APRIL 27—Medical clinic. Peter Bent Brigham Hospital Page 688

APRIL 28—New England Heart Association Page 649 issue of April 13

MAY 3-6—American Association of Mental Defect. Page 614 issue of April 6

MAY 7-15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29

MAY 11—Pentucket Association of Physicians, 8.30 p. m. Hotel Bartlett 90 Main Street, Haverhill

MAY 12 and 13—American Heart Association Page 542 issue of March 23

MAY 13-16—American Board of Obstetrics and Gynecology Page 457 issue of March 9

MAY 14-20—American Physicians Art Association Page 404 issue of March 2

MAY 15-19—American Medical Association St. Louis Missouri

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JUNE 5-6-7 and 8—American Association of Industrial Physicians and Surgeons Page 581 issue of March 30

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OCTOBER 23-NOVEMBER 3—New York Academy of Medicine. Page 581 issue of March 30

FALL 1939—Temperature Symposium Page 218 issue of February 2

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### ESSEX SOUTH

MAY 10—Page 649 issue of April 13

### MIDDLESEX SOUTH

MAY 3—Page 688

### SUFFOLK

APRIL 26—Page 688

MAY 4—Censors meeting Page 688

### WORCESTER

MAY 10—Worcester Country Club—annual meeting

## BOOK REVIEWS

*Shock and Related Capillary Phenomena* Virgil H. Moon 442 pp London, New York and Toronto Oxford University Press, 1938 \$3.50

This stimulating monograph represents the contribution of a pathologist to the solution of the problem of the etiology and mechanism of shock. The rather strange but apparently undeniable fact is pointed out that the vast

are inefficiently eliminated. Bright himself suspected this, and confirmed the suspicion by having a chemist determine the blood urea. (6) The rise in blood pressure, together with its mechanism, is a story in itself.

Dr Boyd presented a chart showing the relation of symptoms to lesions. The glomerulus, through damage to the basement membrane, is responsible for albuminuria, low plasma proteins and edema, through its capillary endothelium, it gives rise to hematuria, hypertension and renal insufficiency. Damages to the tubules results in a loss of concentrating power and, hence, a urine of low specific gravity.

In conclusion, Dr Boyd suggested that a few beacons do stand out in the sea of perplexing problems concerning glomerulonephritis, these are damage to the renal filter, damage to the absorbing mechanism and ischemia.

## NOTICES

### REMOVAL

MOSES J. STONE, M.D., announces the removal of his office to 520 Beacon Street, Boston.

### PHYSICIAN-IN-CHIEF, PRO TEMPORE, OLD HOME WEEK

During the week commencing Monday, April 24, a Physician in Chief, Pro Tempore, Old Home Week will be held at the Peter Bent Brigham Hospital. Those participating, each of whom has at some time served as physician-in-chief, pro tempore, at the hospital, include Dr. Lewellys F. Barker, Baltimore, professor of medicine, emeritus, Johns Hopkins University; Dr. Francis G. Blake, New Haven, Sterling Professor of Medicine, Yale University; Dr. Alvah H. Gordon, Montreal, associate professor of medicine, McGill University; Dr. Duncan Graham, Toronto, professor of medicine, University of Toronto; Dr. James B. Herrick, Chicago, professor of medicine, emeritus, Rush Medical College; Dr. Warfield T. Longcope, Baltimore, professor of medicine, Johns Hopkins University; Dr. O. H. Perry Pepper, Philadelphia, professor of medicine, University of Pennsylvania; Dr. David Riesman, Philadelphia, professor of clinical medicine, emeritus, University of Pennsylvania; and Dr. Rollin T. Woodyatt, Chicago, clinical professor of medicine, University of Chicago. The program is as follows:

#### WARD ROUNDS 10-12

Monday, April 24 Drs. Pepper (leader), Barker, Gordon, Riesman, Woodyatt.  
 Tuesday, April 25 Drs. Riesman (leader), Barker, Blake, Gordon, Graham, Longcope, Pepper and Woodyatt.  
 Wednesday, April 26 Drs. Longcope (leader), Barker, Blake, Gordon, Graham, Riesman and Woodyatt.  
 Thursday, April 27 Drs. Herrick (leader), Gordon, Blake, Graham, Riesman and Woodyatt.  
 Friday, April 28 Drs. Woodyatt (leader), Gordon and Riesman.  
 Saturday, April 29 Staff Rounds. Drs. Gordon (leader), Riesman, Woodyatt and Christman and the medical staff of the Peter Bent Brigham Hospital.

#### AMPHITHEATER CLINICS 3:15-4:45

Monday, April 24 Drs. Barker and Riesman.  
 Tuesday, April 25 Drs. Longcope and Pepper.  
 Wednesday, April 26 Drs. Herrick and Gordon.  
 Thursday, April 27 Drs. Graham and Woodyatt.  
 Friday, April 28 Dr. Christman.

The afternoon amphitheater clinics are open to all physicians and students who may care to attend.

## HOSPITAL RESEARCH COUNCIL

The next meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday, April 25, at 5:00 p.m.

#### PROGRAM

Vitamin C Lack After Major Surgery Dr. C. M. Jones.  
 Prothrombin Determination. Dr. J. D. Stewart.  
 Student Health Problems in Colleges Dr. A. V. Bock.  
 Activity in the Cerebral Cortex During Anesthesia. Dr. H. K. Beecher.

HENRY K. BEECHER, M.D., *Secretary*

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 p.m. on Thursday, April 27, in the amphitheater of the Peter Bent Brigham Hospital, Dr. James B. Herrick will give a medical clinic. Practitioners and medical students are cordially invited to attend.

## SIR WILLIAM OSLER HONOR SOCIETY

Dr. Abraham Myerson, professor of clinical psychiatry at Harvard Medical School, will deliver a lecture, illustrated by slides, on "Human Autonomic Pharmacology" at a meeting of the Sir William Osler Honor Society of the Middlesex University School of Medicine, to be held in the auditorium at 415 Newbury Street, Boston, at 8:00 p.m. on April 26. The medical profession is cordially invited to attend.

## JOINT MEETING OF THE SUFFOLK DISTRICT MEDICAL SOCIETY AND THE BOSTON MEDICAL LIBRARY

A joint meeting of the Suffolk District Medical Society and the Boston Medical Library will be held on Wednesday evening, April 26, at 8:15 p.m., at the Boston Medical Library, 8 Fenway, Boston.

#### PROGRAM

Official reports of the Society for 1938.  
 Election of officers.  
 Science and the Art of Deception. Dr. Francis G. Benedict.

Ladies are cordially invited to attend this meeting.

JAMES M. FAULKNER, M.D., *Secretary*  
 Boston Medical Library

JOHN P. MONKS, M.D., *Secretary*  
 Suffolk District Medical Society

## SUFFOLK CENSORS MEETING

The censors of the Suffolk District Medical Society will meet for the examination of candidates at the Boston Medical Library, 8 Fenway, Boston, on Thursday, May 4, at 4:00 p.m.

Candidates should make personal application to the secretary and present their medical diplomas at least one week before the examination.

JOHN P. MONKS, M.D., *Secretary*

## MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

The annual meeting of the Middlesex South District Medical Society will be held at the Hotel Continental,

Cambridge, on Wednesday, May 3 The business meeting will begin at 11 30 a. m. At noon the annual oration will be delivered by Dr Roy D Halloran on Opportunities of the Psychiatric Hospital in the Mental Health Problem. Members in good standing are invited to the luncheon at 12 45 p. m.

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## BOOK REVIEWS

*Shock and Related Capillary Phenomena* Virgil H. Moon 442 pp. London, New York and Toronto Oxford University Press, 1938 \$3.50

This stimulating monograph represents the contribution of a pathologist to the solution of the problem of the etiology and mechanism of shock. The rather strange but apparently undeniable fact is pointed out that the vast

literature on this problem has emanated almost solely from surgeons and physiologists, without the corroborative evidence available in morphologic pathology, which, it is believed, furnishes convincing proof that shock is due to diminished blood volume and flow dependent on the leakage of plasma into the tissues as a result of increased permeability of the capillary endothelium and on an enormous increase in the capacity of the capillary bed, especially in visceral areas, with consequent stagnation and increased concentration and viscosity of the blood. The chief theories variously ascribing the universally admitted circulatory failure of shock to a weakened myocardium, to exhaustion of a vasomotor nerve center, to a failing venopressor mechanism, to decreased alkali reserve and acapnia and to hypothetical poisonous substances liberated from injured tissues are critically reviewed and evaluated, and their apparently untenable features pointed out. The structure and function of capillaries, — normal and pathologic, — as revealed in recent studies, are described, and the fact emphasized that they are endothelial tubes capable of contraction and dilatation, possibly under vasomotor control but certainly under the influence of substances freed from tissue cells suffering from anoxia. This is the key to the vicious circle of shock: tissue anoxia, dilatation and increased permeability of capillaries, stagnation and concentration of blood, increased tissue anoxia. It is pointed out that the circulatory failure characterizing a wide variety of conditions — burns, anaphylactic shock, poisoning by food, bee sting, snake venom, peptones or various mineral agents, metabolic intoxications, acute infections, acute abdominal emergencies and peritonitis — is due to the same alteration of capillary function. Congestion of the viscera is regularly recorded in the necropsy records of all these conditions and is usually interpreted as "passive congestion due to heart failure," whereas the condition is actually acute capillovenous congestion and congestive circulatory failure, which are not to be ascribed to myocardial weakness except in cases of demonstrable cardiac defect or degeneration.

Dr. Moon's monograph is not lacking in practical applications of his theory of shock. He points out that hemoconcentration, which is fairly easily demonstrable by simple methods, occurs before any marked fall of blood pressure, which is maintained by the efficiency of the myocardium and the vasoconstrictor center; this is the earliest detectable manifestation of shock and the most accurate index of its severity. He discusses the logic of various therapeutic methods and emphasizes the primary need to restore blood volume and capillary tone and to correct anoxia. He has succeeded admirably in integrating the mass of factual information about shock — derived from more than 400 titles in the appended bibliography. Doubtless it will be a long time before the last word is written about shock, but Dr. Moon's discriminating review of the literature and his application of the evidence afforded by pathology to the solution of the problem constitute an important contribution.

*Diagnostic Standards Tuberculosis of the lungs and related lymph nodes* 32 pp Tentative edition New York National Tuberculosis Association, 1938

This pamphlet, which is the eleventh in a series published by the National Tuberculosis Association, is a tentative one, and hence comments are requested. So long as the diagnosis and treatment of pulmonary tuberculosis undergo changes, so long will our conceptions and standards have to be revised to conform with the best opinions of the day.

It is noteworthy that the terms "childhood type" and "adult type" have been replaced by "primary tuberculosis" and "reinfection tuberculosis" respectively. Although the latter terms hardly describe the true underlying lesions, as no infection is strictly primary and one cannot draw the line between primary infection and reinfection, nevertheless they give a better concept of the pathologic changes than did the earlier terms.

Another section worth mentioning is the paragraph defining the minimum standard for a "negative sputum." This is no longer a haphazard term, but requires that at least three adequate specimens per month shall have been found to be negative, both by direct smear and by concentration. For patients to be designated as apparently "cured," the sputum must remain negative to repeated cultures and animal inoculations.

The reviewer wonders why nothing was said about the erythrocytic sedimentation rate and differential leukocyte studies. It appears to be universally accepted that a case cannot be designated as apparently cured unless the sedimentation rate is within normal limits. It is hoped that the above laboratory studies will be included in the next edition.

*Control of Conception* Robert L. Dickinson Second edition 390 pp Baltimore Williams & Wilkins Co., 1938 \$3.50

In his book the author has gone into the whole subject of the control of conception in a most systematic, painstaking manner. The effectiveness of the various types of prevention is thoroughly discussed, and explained in great detail. The entire book is carefully illustrated by his own drawings. For those physicians who want a complete, authoritative work on the subject of contraception, this book will prove very satisfactory.

The laity has so many times confused the control of conception with abortion that it seems to the reviewer inadvisable for Dr. Dickinson to have included the indications and technique of abortion in this otherwise excellent book.

*A Manual of Reparative Plastic Surgery* J. Eastman Sheehan 311 pp New York and London Paul B. Hoeber, Inc., 1938 \$5.50

Since the World War there has been a growing interest in reparative plastic surgery. As a result, in addition to papers appearing in surgical journals, many books have been published on the subject. This interest is undoubtedly due to an increase of traumatic injuries from automobile and other civilian accidents.

Dr. Sheehan's book is printed in good type. It is profusely illustrated with diagrams and photographs which are very helpful. The author has divided the book into two parts. The first is directed to general consideration of principles of plastic repair, while the second describes various plastic operations.

A more critical survey indicates that, while certain subjects, such as plastic operations on the eyelids and the nose, are well covered, other sections are quite incomplete. This is particularly true concerning mandibular defects and reconstructive problems.

The point is rapidly being reached at which no single book on plastic surgery will be anything more than an introduction to the subject. The field as a whole has become unusually wide, and a book of the sort being reviewed, aside from providing a panorama of high lights, has its chief value in presenting the author's own particular clinical contributions and methods of procedure. In this last respect this volume should prove of value.

# The New England Journal of Medicine

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VOLUME 220

APRIL 27, 1939

NUMBER 17

## BLOOD DYSCRASIAS\*

With Special Reference to Splenectomy

J H J UPHAM, M.D.†

COLUMBUS, OHIO

IN discussing the subject of blood dyscrasias, with special reference to splenectomy, it is my intention to review the work of Drs Doan, Wiseman and Curtis, in the Spleen Clinic of the College of Medicine of Ohio State University, and to add some data in support of their published arguments for the performance of splenectomy in selected clinical conditions at times when prevailing surgical opinion has been quite definitely against operative interference. I shall restate the scientific basis for their position.

The spleen is one of those enigmatic organs of the body which, while apparently yielding freely its secrets of structure, both gross and microscopic, has, as it were, been holding back some hidden qualities having powerful influences on the maintenance of health, and under certain circumstances, even becoming capable of producing serious disturbances.

Probably the main reason for our tardiness in learning more of the splenic factor in certain human blood dyscrasias is the absence of finding such dyscrasias in animals, and the failure as yet to produce them experimentally.

While we, therefore, owe much of our knowledge of the anatomy and physiology of the spleen to animal studies, it is perforce normal anatomy and normal physiology. However, by careful clinical observations, by studies of the blood using the latest techniques, by examination of materials obtained at biopsy, during major surgery and from the autopsy, very definite and suggestive data have been accumulated.

I need not discuss the anatomy or dilate upon the generally accepted physiology of this organ.

Since Barcroft's work, the spleen has been regarded as a physiologic reservoir of red blood cells. It contracts during periods of physical activity to discharge an increased number of red cells to carry additional oxygen to the tissues. It functions as the "graveyard" for blood cells, and probably helps to conserve the iron of the destroyed red cells, and it may be that in the breaking up of these latter there is set free some chemical stimulant to fresh red-cell production.

The attention of Doan<sup>1</sup> and his associates has been particularly directed in the last few years to the destructive activity of the spleen for various blood elements in certain of the primary blood dyscrasias.

It has been the experience in medicine that whenever any physiologic function is recognized for any organ, a disease entity due to a corresponding pathologic dysfunction may be anticipated, and sooner or later will be encountered. Thus, in congenital hemolytic jaundice there is recognized a simple dominant, familial tendency for the normal physiologic erythroclastic function of the spleen to become overemphasized to the point of definite pathologic manifestations.

First observed by Murchison in 1885, established as a clinical entity by Hayem thirteen years later, and its familial occurrence recorded by Minkowski at the turn of the century, hemolytic jaundice remains, nevertheless, a frequently unrecognized pathologic state, and this despite signs always and symptoms frequently which should make the diagnosis relatively simple.

With Lord Dawson of Penn<sup>2</sup> and an increasing group of clinical observers it is the belief of the Ohio State University investigators<sup>3</sup> that true hemolytic icterus is always the manifestation of an inherited constitutional defect, characterized, when clinically active, by recurring "crises of deglobu-

\*Presented at the annual meeting of the New Hampshire Medical Society, Manchester, May 16, 1938.

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lization," marked microcytic normochromic or hyperchromic anemia, increased erythrocyte fragility, unusually high reticulocytosis, acholuric icterus and splenomegaly

Evidences of the disease may be present at birth or may first appear in any decade, however, the inherited tendency may be carried and transmitted without the development of clinical manifestations. Furthermore, the severity and frequency of clinical disease may vary widely from family to family, thus making it essential to have the requisite laboratory studies in a sufficiently representative sampling of blood relatives before an exclusion of the hereditary element in an apparently sporadic or "acquired" case is justified. In all but 1 of the 15 families studied in Columbus the individual first seen with clinical symptoms knew nothing of the character of his "jaundice" or "anemia" and was entirely unaware, as were the other members of the family, of the presence of any hereditary disease, though it existed in more or less obvious degree in representatives of each generation available for examination.

The importance of recognizing this constitutional defect, when it exists, lies in the fact that a fatal relapse or exacerbation of the disease may occur spontaneously, or be precipitated by infection or trauma, in any decade of life, and that, with the institution of adequate therapy (splenectomy) either as a prophylactic or curative measure, the clinical results are highly satisfactory and permanent.

It was the study of the more chronic phases of this disease and the analysis of the changes induced by splenectomy, under these admittedly favorable circumstances, which formed the basis for the first excursion of our research group<sup>4</sup> into the realm of human splenic pathologic physiology. Two principal objectives motivated these observations, first, the determination of the natural history of the disease, which necessitated long periods of observation with serial laboratory studies in the same individual prior to any therapeutic intervention, and second, an analysis of the immediate as well as the more remote changes in the cellular and chemical constituents of the blood following the removal of the spleen.

These data have a direct bearing on the question of the relative roles of spleen and bone marrow in the causation of this disease syndrome, and thereby form the essential basis for the establishment of the principle of splenectomy as a rational therapeutic measure, which data, if judged sufficient for the quiescent phases of the disease, should apply as well in directing therapy in the more acute phases.

In the first study<sup>4</sup> of clinical cases of chronic con-

genital hemolytic jaundice in our clinic, daily estimations of the various cell levels were made for periods of three months or longer to establish thoroughly the range of fluctuation existing before operative intervention was undertaken. Then, on the day of operation, blood studies were made at fifteen-minute to half-hour intervals throughout the day, with the astonishing discovery that instead of the erythrocyte increase, as described in the literature, coming in from one to three months following the removal of the spleen a major increase, frequently of 1,000,000 or more red blood cells per cubic millimeter occurred immediately, before the patient left the operating table, irrespective of the preoperative level of the total red cells.

This phenomenon was observed not occasionally or sporadically but regularly, whenever sufficient hematologic studies were made. The lower the red-cell level, and the more active the hemolytic process, the more dramatic the response. Blood volume studies proved this erythremia to be not simply a relative cell increase, dependent on some loss in plasma volume, but established as the more important element in the equation an immediate large significant increase in the actual circulating erythrocytic cell volume. Hemoglobin, leukocytes and thrombocytes likewise rose promptly, coincident with dramatic clinical improvement. A progressive decrease in the icteric index and the reticulocytes, which always follows removal of the spleen in hemolytic jaundice, and a readjustment in the iron level of the plasma reflected the elimination or subsidence of the hemolytic process. Moreover, an increase in the blood cholesterol to normal, the gradual return of the red cells to a more nearly normal diameter and volume, and the resumption of a more nearly normal range of erythrocytic resistance seemed to be evidence of a better product, delivered under less urgent and stressful circumstances by a bone marrow released from an abnormal and inimical splenic influence. In short, the data obtained suggested that the disgorgement of the sequestered blood cells from the splenic reservoir incident to operation and the sudden elimination of the destructive activity of the splenic phagocytes render more effective the unusually active erythropoiesis and erythrocytic delivery that characterize the bone marrow in hemolytic anemia.

Up to the present time, our investigators<sup>1</sup> have studied more or less thoroughly 85 blood relatives in 15 families, finding evidences of the trait in 40, and have seen the removal of the spleen successfully accomplished in 17 clinically active cases. Complete data have been obtained concerning all patients who have been operated on. In this group, removal of the spleen was accomplished in 5



patients during a quiescent interlude of the disease as a prophylactic procedure, in 5 patients, operative intervention was decided on during a subacute exacerbation of the hemolytic process, and in 7 critically ill patients the spleen was removed as an emergency procedure with the total red-cell count rapidly approaching or actually under 1,000,000 cells per cubic millimeter in a fulminant, acute, hemoclastic crisis

#### RATIONALE OF SPLENECTOMY IN ACUTE HEMOCLASTIC CRISES

The gradual accumulation of such facts as have been cited formed the background for a growing conviction that, given proper medical judgment and adequate surgical management, the patient in acute erythroclastic crisis should respond even more dramatically and promptly to the surgical removal of the spleen than those seen in the subacute and chronic phases

During the past three years, on seven separate occasions, our staff has been faced with the problem of critically severe, progressive, acute erythroclastic crises in patients with an age range from four to fifty-six years. In several cases, intensive liver therapy and repeated blood transfusions had failed to encourage a remission. The anemia with its attendant manifestations became so severe as to threaten imminent death, yet no remediable cause could be found other than the persistent exacerbation of the underlying congenital hemolytic process

One might conclude from the literature that such critical crises are exceedingly rare, inasmuch as deaths are seldom reported and spontaneous remissions are known usually to follow a hemolytic episode. Such has not been the experience in our clinic. In no instance has splenectomy been undertaken in the stage of acute crisis except after the failure of every medical means and as an emergency lifesaving measure

The confusion of this condition in its more acute phases with certain other anemic states may account for the rarity of its mention in the past and the universal surgical dictum against splenectomy. The important diagnostic points have already been listed, together with the warning that any one or more of the cardinal features, including clinical jaundice, may be absent in the individual patient. Nevertheless, the identification of this disease is all that is necessary to bring it under control in practically 100 per cent of cases, if the pathologic physiology of the spleen is adequately understood, and its relation to the hemolytotoxic equilibrium recognized. All 7 of the patients in acute crisis who were subject to splenectomy at a time when the total red cells were at

or near the 1,000,000 mark showed a spectacular clinical response on the operating table, all survived, and each returned promptly to a normal hemolytotoxic balance. Accurate diagnosis, adequate medical management once the diagnosis was established, and careful surgical technic were the essentials of success. Neither the cause of the crisis, the severity of the anemia, nor the obviously critical clinical condition of the patient has been sufficient to cause us to withhold operative intervention

The seriousness of the surgical risk in hemolytic icterus is not to be measured in terms of the usual criteria, because of the autotransfusion which occurs coincident with the operative manipulation of the spleen itself, the immediacy of the reversal in the hemolytic mechanism involved, and the essential integrity of the marrow. Were the bone marrow chiefly responsible for the clinical manifestations of hemolytic icterus, particularly in the crises, an operative procedure would only further embarrass this organ. Instead, a hyperplastic marrow producing new red cells at a rate sufficient to maintain reticulocytes at 100 per cent in the circulating blood, but still unable to establish a positive erythrocyte balance, at once becomes adequate, and there is evidence (rapid decrease in reticulocytes) of a lessened functional demand immediately following splenectomy

#### THE SPLEEN AND WHITE-CELL EQUILIBRIUM

Krumbhaar<sup>5</sup> has noted the prompt thrombocytosis, granulocytosis and monocytosis and the tardy lymphocytosis which follow the removal of the normal mammalian spleen. In hemolytic icterus with splenomegaly our investigators have called attention to the frequency with which a moderate thrombocytopenia and leukopenia have been encountered and the characteristic increase in these elements, as well as in the red blood cells, which follows splenectomy. Experimental studies<sup>6</sup> have demonstrated a physiologic sequestration function of the spleen for white blood cells and blood platelets which make this mechanism a potentially important factor to be considered when these elements are found to be deficient in patients

One of the most constant and characteristic differential diagnostic points in Banti's syndrome is the profound leukopenia which occurs. There are at present three methods of treating Banti's disease: the medical with blood transfusions as necessary following hemorrhage and with liver extract and a high-carbohydrate dietary regime in the interims, the surgical, with splenectomy in the early cases where possible, and ligation of the splenic artery in those late cases where, because of adhesions and dilated veins, the spleen cannot

lization," marked microcytic normochromic or hyperchromic anemia, increased erythrocyte fragility, unusually high reticulocytosis, acholuric icterus and splenomegaly

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splenectomy in the acute cases may be explained on the basis of two extenuating circumstances the difficulty of accurate differential diagnosis in terms of underlying etiology, which has resulted in the inclusion of other than true thrombocytolytic or splenic inhibitory thrombopenic cases in the statistical surveys of the past, and the materially greater operative risks which formerly attended splenectomy per se and which have been decidedly lessened through an increased efficiency in both the medical preparation and surgical handling of these patients

In an analysis of the literature, Marsh<sup>11</sup> was impressed with the fact that blood transfusion was used in none of the 10 acute cases operated on prior to 1925 except the 1 in which recovery was reported, whereas in the 4 successful cases recorded during the succeeding five years blood transfusion had been an immediate preoperative procedure in each. He concludes that the platelet count does not seem to be a factor in the surgical prognosis, but that transfusion and the red-cell and hemoglobin levels are exceedingly important. Our experience<sup>1</sup> would bear out the importance of preoperative transfusion to ensure adequate hemostasis, but where the spleen is involved, because of the intimate relation it bears to the formation, storage and destruction of blood elements, the actual preoperative level of the red cells is not so important. The normal cellular levels are more certainly and promptly attained by splenectomy through the adjusted hemolytopoietic equilibrium than they are by repeated blood transfusions.

The theory of the hyperpermeability of the vascular endothelium as the fundamental pathologic lesion in hemorrhagic purpura need only be mentioned. Bedson<sup>12</sup> has shown that both platelet deficiency and endothelial damage are at times essential to the experimental production of purpuric manifestations and that sometimes one and sometimes the other may present the chief conditioning factor in the syndrome. Koster<sup>13</sup> explains the thrombopenia as the result of increased phagocytosis of platelets plus a dysfunction in thrombopoiesis. Duke<sup>14</sup> has suggested endothelial permeability as the primary cause, with the consequent increased demand for platelet plugs responsible for the development of the thrombopenia. Infectious foci may liberate toxic substances which result, through some of the above mechanisms, in purpuric manifestations. Many patients with functionally and quantitatively adequate thrombocytes exhibit a hemorrhagic diathesis, usually mild and exceedingly chronic, and vitamin C, an antiscorbutic, intercellular-substance vitamin, sometimes, but not always, corrects this tendency. An allergic basis has been established in some patients, with improvement after elimination diets or following

adequate desensitization therapy. There remain, however, in the opinion and experience of our investigators, after every other causative factor has been eliminated, a group of essential thrombocytopenic purpuras with the sternal bone marrow showing normal megakaryocytes, both in number and in quality, in which it has been impossible to obtain permanent benefit without removal of the spleen. In their experience, deep x-ray therapy has not been found to be a successful substitute in these cases.

There are obviously many factors that influence blood coagulation and extravasation which are not now known, and a more rational approach must await further information. One case will indicate the sequence of events when splenectomy is successful in the treatment of purpura. A young lady with purpura, more or less recent and acute in onset, showed an almost complete absence of platelets and no thrombocyte response to the adrenal test. There was, however, marked evidence of bone-marrow activity, exemplified in a leukocytosis of 30,000 and a reticulocytosis of 57 per cent. The spleen was normal in size and nonpalpable, and after removal, showed no microscopic evidence of endothelial or clasmotocytic hyperplasia. Within twenty-four hours of the last critical relapse to 600,000 erythrocytes, and after two emergency blood transfusions totaling 1100 cc., removal of the spleen was successfully accomplished. The platelets reappeared immediately in the circulation on the day of operation and convalescence was prompt and uneventful. All medical measures, including repeated blood transfusions had failed during the sixteen days of hospital observation, the condition on two occasions having become critical due to excessive blood loss. The behavior of the platelets suggests that, following splenectomy, the removal of the phagocytic clasmotocytes with this organ immediately released to the circulation those units which the bone marrow had been producing and that the secondary rise later may have been due to the increased megakaryocytic activity following elimination of some splenic inhibitory effect. This patient has remained well with high thrombocyte levels at all times during the past three years. One year after splenectomy, a normal baby was delivered at term after an uneventful pregnancy, but the platelets in the infant were definitely low, 150,000 to 200,000 per cubic millimeter. The study is being continued.

The thrombocytosis, described by Krumbhaar, Evans and others, which follows splenectomy has received striking and complete confirmation in our series of patients. In the majority of cases the blood platelets rose to levels well above 1,000,000 per cubic millimeter, and only once was there a failure of the thrombocytes to show a

be removed with safety. Each method has its own particular advocates and our workers have had personal experience with all three. Only if the spleen is successfully removed is there an elimination of the leukopenia, and this change is dramatic and permanent when it occurs. With the ligation of the splenic artery there is a gradual diminution in the size of the spleen and the white-cell count may increase to 2000 or 2500 per cubic millimeter, but the tendency to recurrent esophageal hemorrhages and to progressive hepatic cirrhosis is not appreciably diminished.

Individuals who refuse operation or in whom neither splenic-artery ligation nor splenectomy can be successfully accomplished receive some symptomatic relief from the medical regime mentioned and suffer only occasional attacks of acute hepatic distress. Because of the complete correction of the leukopenia and because there has seemed in our small series of patients to have been a less rapid progression of the hepatic insufficiency, as measured by available tests, after removal of the spleen, it is our present belief that the attempt should be made to diagnose Banti's syndrome early and to remove the spleen promptly, if possible. Long-time follow-up studies in this group of patients and a more complete knowledge of the etiology of this disease must precede any final authoritative conclusions.

#### THE SPLEEN AND THROMBOCYTOPENIA

A single etiology for thrombocytopenic purpura hemorrhagica is not known, the pathology is ill-defined and varied, and the differential diagnosis is frequently difficult to establish. After long years of study by many investigators such continues to be the present status of this problem. The reason is quite apparent. The mechanism involved in the maintenance of the fluidity of the blood is so complex, and the vulnerable points at which some small deflection may result in hemorrhage are so numerous, that each patient presenting with a syndrome which includes a bleeding tendency must be subjected to the minutest scrutiny before a successful rationale of treatment may be outlined. While we are quite familiar in our own clinic, and as recorded in the medical literature, with the multiplicity of symptomatic purpuric states, with the frequency of spontaneous remissions in the idiopathic cases, and with the efficacy at times of properly administered and repeated blood transfusions in inducing remissions, we are concerned at this time only with those cases which show a definite thrombopenia associated with some splenic abnormality, and more particularly with the very acute fulminating case that presents an immediate clinical emergency.

The following objective criteria have been quite well agreed on as a starting point and as the *sine qua non* for the placing of any given hemorrhagic syndrome under the general heading of true purpura: a low or absent platelet count, a prolonged bleeding time, a normal clotting time, but a failure of the clot to retract, spontaneous or induced petechiae (positive tourniquet test), a leukocytosis, and perhaps reticulocytosis (which rule out a general marrow hypoplasia), and an absence of abnormalities in red or white cells indicative of pernicious anemia, leukemia or other foreign cellular metaplasia in the marrow inimical to megakaryocytic activity.

Denys, in 1887, first called attention to the relation which exists between decreased blood platelets and hemorrhagic disease. It was not, however, until November, 1916, that Kaznelson,<sup>7</sup> of Prague did the first splenectomy for "thrombocytolytic purpura," basing his action, as the name implies, on the hypothesis of the destructive activity of this organ for these elements.

Frank,<sup>8</sup> on the other hand, while recognizing the value of removal of the spleen for what he termed "essential thrombopenia," based his advocacy of this procedure on the assumption that the reduction in platelets was due to an inhibitory action of the spleen on the bone marrow. This division of opinion has persisted to the present time among clinical investigators, with the majority favoring Kaznelson's interpretation. It would seem to us that all are correct. Both inhibitory and lytic functions have been equally well established for the spleen.

The beneficial effects of splenectomy may arise through either mechanism. The dangers attending splenectomy in the acute hemorrhagic diatheses have been repeatedly emphasized. Whipple,<sup>9</sup> in 1926, reviewed 81 cases of splenectomy for hemorrhagic purpura, there were only 6 deaths among the 73 cases classified as chronic, while 7 of the 8 acute cases died. Two years later, Spence<sup>10</sup> collected 101 cases, with satisfactory clinical results reported in 75. Eight only of the 80 chronic patients died as a result of the operation, while 10 of the 12 acute cases were fatal. The duration of the hemorrhages was not given in 9 cases.

Such statistical studies have resulted quite naturally in a warning against operative interference in the presence of the more acute purpuric manifestations, dependence being placed preferably on repeated transfusions in the attempt to induce a more quiescent phase of the disease. Blood transfusion is, of course, lifesaving and, of necessity, is used as an emergency measure in every case of extensive, acute hemorrhage. However, we believe that the high mortality rate now attributed to

splenectomy in the acute cases may be explained on the basis of two extenuating circumstances the difficulty of accurate differential diagnosis in terms of underlying etiology, which has resulted in the inclusion of other than true thrombocytolytic or splenic inhibitory thrombopenic cases in the statistical surveys of the past, and the materially greater operative risks which formerly attended splenectomy per se and which have been decidedly lessened through an increased efficiency in both the medical preparation and surgical handling of these patients

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The thrombocytosis, described by Krumbhaar, Evans and others, which follows splenectomy has received striking and complete confirmation in our series of patients. In the majority of cases the blood platelets rose to levels well above 1,000,000 per cubic millimeter, and only once was there a failure of the thrombocytes to show a

marked sustained elevation over the preoperative control period, and in this patient the purpuric symptoms and signs were eliminated. Moreover, the blood platelets in all patients before splenectomy were definitely reduced below normal (710,000 per cubic millimeter), according to the method used for their estimation in this study. There can be no doubt as to the inhibitory effect of the spleen on thrombocytes, this is a physiologic function which, under certain abnormal circumstances, becomes pathologic and presents in greater or lesser degree a complication demanding careful consideration.

#### CONTRAINDICATIONS TO SPLENECTOMY

In our studies it has seemed that in the leukemias and in polycythemia vera the splenomegaly which occurs is a protective response and that in such cases splenectomy is distinctly contraindicated. In sickle-cell anemia there is some difference of opinion among clinical investigators, but in our clinic, improvement has never been observed following removal of the spleen in this disease, and in 2 cases there occurred the post-operative precipitation of fatal acute hemoclastic crises.

Even where a disease exists which has been proved to be benefited by splenectomy, it is essential to analyze each problem individually and to select the time and the circumstances, where possible, which will give each patient the optimum chance for recovery.

The spleen is an important organic unit in the hemolytopoietic functioning of the mammalian body, and its pathologic physiology must be understood both to avoid unnecessary or even harmful removal and to accomplish its occasional lifesaving excision.

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PAPERS FROM THE FAULKNER HOSPITAL

A FIFTEEN-YEAR REVIEW OF OBSTETRICS AT THE FAULKNER HOSPITAL\*

JAMES R TORBERT, MD† AND ROBERT M SMITH, M.D.‡

BOSTON

ON August 8, 1917, the present maternity unit of the Faulkner Hospital was opened, and 133 babies were born in the following year. In 1937, with practically the same equipment, there were 534 births. During the early years the major percentage of cases were delivered by Boston obstetricians, but soon the hospital was used more and more by general practitioners of the adjacent district, and these men now do the majority of the obstetrics.

The obstetric service has a wing separate from the rest of the hospital, with a regular capacity of twenty-four beds and an overflow capacity of thirty-one. There are two large nurseries and a room for premature infants. The obstetric staff is headed by the chief of the department and three assistants. The other members are divided into two classes. Class A are men specially trained in obstetrics, while Class B are those who have not had special training and for whom the chief obstetrician and his associates have formulated cer-

tain restrictions in operative obstetrics, consultations being required in difficult cases. These restrictions are set forth in a precedent book, a copy of which is on the obstetric ward. This is a reference book in which is set forth a plan of treatment for all types of obstetric cases.

During the last fifteen years, 6052 babies have been delivered at the Faulkner Hospital. Of these the percentages of normal deliveries were 48.5, 43.1 and 42.9, respectively, in the successive five-year periods. This slight decrease has occurred in spite of our effort to increase the number of normal deliveries, an objective which we consider to be essential in reducing maternal as well as fetal morbidity and mortality. It is our belief that intelligent use of medication increases the possibility of normal delivery and that all patients in labor should have the benefit of some method of analgesia.

As analgesics, the barbiturate derivatives, Sodium Amytal (up to 18 gr) and Nembutal (up to 10

TABLE 1 Statistical Summary

YEARS	TOTAL DELIVERIES	NORMAL DELIVERIES	FORCEPS DELIVERIES	BREECH DELIVERIES	CESAREAN SECTIONS	MATERNAL DEATHS	INFANT DEATHS	STILL BIRTHS
1924-29	1765	841	705	41	5	7	22	50
1929-34	1835	793	833	61	62	3	25	43
1934-39	2452	1052	1049	53	196	4	33	62
Totals	6052	2686	2587	160	263	14	80	135

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There are three house officers at the Faulkner Hospital, and each has 10 to 15 deliveries during his four month period on the obstetric service. It is the aim to provide sufficient experience and instruction during this period so that a man may start general practice. If he is to specialize in obstetrics it is, of course, necessary for him to have additional training in a maternity hospital.

Because the organization of the obstetric service at the Faulkner Hospital is unique and because we believe that the publication of the results of

gr), in divided doses, are used. Scopolamine or morphine subcutaneously, chloral hydrate orally, and ether or paraldehyde rectally are frequently combined with the barbiturates.

FORCEPS DELIVERIES

It is believed that the proper use of a low forceps is indispensable in the practice of good obstetrics, but that its use should not be routine. The earlier recognition of posterior positions has removed one of the commonest causes of the difficult forceps deliveries that resulted in extensive perineal lacerations and birth injuries to the babies. Episiotomy is advised in all forceps deliveries in primiparas, and traction rods are recommended only to bring a low mid-head onto the floor of the perineum. The use of high forceps is mentioned only to condemn the maneuver as one that is practically obsolete, while internal podalic version still has an occasional place in operative obstetrics.

From the Faulkner Hospital, Boston.  
†Chief obstetrician, Faulkner Hospital.  
‡House officer, Faulkner Hospital.

## BREECH DELIVERIES

In the ten years from 1924 to 1934 there were 102 breech deliveries with 12 infant deaths, mortality of 12 per cent. This compares favorably with the average rates of from 6 to 32 per cent mentioned in textbooks<sup>1</sup>. The infant mortality in primiparas is considerably higher than that in multiparas, in the latter the mortality should be negligible. The use of medication during labor has materially helped these cases, allowing full dilatation of the os and descent of the breech into the outlet. The chief danger in manual extraction is damage to the nerve plexuses of the arms and spinal cord from irregular and too strenuous traction. In many cases the patient will deliver normally. In others, intelligent suprapubic pressure simplifies the delivery. In primiparous cases it is advisable to use episiotomy, with forceps on the aftercoming head. These steps appreciably reduce the incidence of damage to the fetal vertebrae and cord.

## CESAREAN SECTIONS

We regard our incidence of cesarean section as too high and look with disfavor on the increasing percentage. The rates in the three successive five-year periods are 0.3, 3.4 and 8.0 per cent respectively. The average for the fifteen-year period is 4.3 per cent, or 1 in every 23 cases. In forty-five hospitals in Massachusetts the incidence in 1937 varied from 1 in 4 cases to 0 in 209 cases, with an average of 1 in 34 cases<sup>2</sup>. At the Faulkner Hospital the types of operation used were classical,

TABLE 2 *Indications for Cesarean Section*

INDICATIONS	NO OF CASES
Previous cesarean section	85
Pelvic disproportion	58
Premature separation of placenta	13
Toxemia	18
Placenta previa	10
Eclampsia	3
Dystocia due to previous operations	8
Cardiac disease	3
Nephritis	2
Diabetes	11
Elderly primipara	7
Malposition of fetus	
Breech	11
Persistent ROP	4
Transverse	2
Previous obstetric disaster	3
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High head	9
Premature labor attempt to get living baby	1
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We submit the indications for cesarean section (Table 2) as stated on the record charts with the

belief that some are open to criticism. In this hospital only 3 patients have had normal pelvic deliveries following previous cesarean section. We are certain that careful study of these cases would have resulted in an increased number of pelvic deliveries. Diabetic patients are being submitted to cesarean section routinely by one of our staff in an effort to prevent late fetal death in utero, to date there have been 11 cases, with no maternal deaths and but 1 fetal death. In all 263 sections there have been 3 maternal deaths, a mortality rate of 1.1 per cent. These cases will be subsequently discussed.

## MATERNAL DEATHS

Of all statistics, those having to do with maternal deaths rank as the most important in obstetrics, and we are pleased to find on our records only 14 deaths in 6052 deliveries during the past fifteen years, a mortality rate of 2.3 per 1000. Cases of abortion are not included in this list. These figures are far below state and national averages and compare favorably with figures of other hospitals, as is shown in Table 3. It should be pointed out that the Faulkner Hospital serves a small community and keeps in relatively close contact with the local physicians, hence the incidence of neglected patients is lower than that of hospitals covering large districts, this naturally exerts a favorable effect on the number of maternal deaths.

TABLE 3 *Maternal Deaths*

HOSPITAL OR REGION	YEAR OR YEARS	NO OF DELIVERIES	MATERNAL DEATHS PER 1000 DELIVERIES
Faulkner Hospital	1924-39	6052	2.3
Boston Lying in <sup>3</sup>	1935	2728	3.6
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The 14 fatal cases can be summarized as follows:

*Case 1* The patient entered with a temperature of 105°F and died 5 days later of bronchopneumonia.

*Case 2* Lobar pneumonia developed after delivery, and death occurred in 4 days.

*Case 3* Normal delivery was followed by a normal pulse and temperature for 8 days. Then there were 6 days with symptoms of a mild phlebitis, and sudden death from pulmonary embolism on the 15th day.

*Case 4* Premature separation of the placenta occurred. After pelvic delivery the patient went into shock and died while being transfused. Incompatibility of blood was thought to be the cause of death.

*Case 5* The patient died of bilateral bronchopneumonia with peritonitis.

*Case 6* Normal delivery was followed by surgical shock. The patient was transfused but died 12 hours after delivery. Autopsy showed no cause of death.



*Case 7* After normal delivery and 13 days of uneventful convalescence, the patient suddenly died of pulmonary embolism on getting up for the first time.

*Case 8* The patient had severe cardiac disease and died 12 hours after delivery.

*Case 9* Low-forceps delivery was followed by hemorrhage, shock and death. No rupture of the uterus or cervical laceration could be found.

*Case 10* The patient had fulminating eclampsia, death occurred 13 hours post partum.

*Case 11* A repeat cesarean section was performed, with elective appendectomy. Puerperal infection developed and led to death in 14 days.

*Case 12* Pregnancy was complicated by toxemia and toxic cardiac dilatation. The patient underwent cesarean section and died of pulmonary congestion 15 minutes after completion of the operation.

*Case 13* Cesarean section was performed for disproportion. Peritonitis and septicemia developed, ending with death 13 days post partum.

*Case 14* The patient developed agranulocytic angina and died 6 days post partum.

Three patients died from postpartum hemorrhage and shock during the first two periods covered by this paper. Since then, with the improved knowledge of the mechanism of shock and the technic of blood transfusion, these accidents have been avoided. Appendectomy at the time of a cesarean section, as in Case 11, is a questionable

TABLE 4 *Causes of Infant Deaths*

CAUSE	NO OF CASES
<b>Vertex cases</b>	
Prematurity	22
Birth injury	8
Erythroblastosis	4
Asphyxia	2
Adrenal hemorrhage	2
Monstrosity	1
Ruptured uterus	1
Malnutrition	1
Umbilical infection	1
Congenital heart disease	1
Overlying mother insane	1
Premature separation of placenta	1
Atelectasis	1
Purpura hemorrhagica	1
Unknown	9
<b>Breech cases</b>	
Operative death	2
Monstrosity	2
Prematurity	1
Intracranial hemorrhage	1
Toxemia of pregnancy	1
An epartum bleeding	1
Unknown	4
<b>Version cases</b>	
Intracranial hemorrhage	4
Monstrosity	3
Prematurity	2
Perforation of aftercoming head	1
Placenta previa	1
Unknown	1
<b>Total</b>	<b>80</b>

procedure. All elective surgical procedures at such a time should be avoided.

#### INFANT DEATHS

By an infant death is meant the death of any infant who, after birth, had evidence of heart or

lung action. It was difficult to compile these statistics for the first ten-year period of this study, due to incomplete histories of pregnancy and delivery, but the records for the last five-year period were fairly complete, due primarily to the revised labor forms which had to be filled out by the attending physician before he left the hospital.

There were 80 infant deaths during the fifteen years, 1923-1938, a rate of 13 per 1000 births, which compares favorably with the Massachusetts figures for 1923-1938 of from 43 to 91 and United States figures for the same period of from 54 to 73.<sup>5</sup>

Prematurity ranks first in cause of both prenatal and postnatal infant deaths (Table 4). In defining prematurity we take into consideration both the weight and the date of expected delivery. An infant under 5 pounds in weight or born during the first six months of pregnancy falls in this group, and in case of death, prematurity may frequently be listed as the sole cause. It is considered improbable that infants over 5 pounds in weight or beyond the seventh month of gestation die of immature development, and other causes should be found.

#### STILLBIRTHS

A stillborn baby was considered to be one that was dead before or on delivery. There were 135 stillbirths in 6052 deliveries. As will be seen from Table 5, the majority of cases were delivered by

TABLE 5 *Methods of Delivery in Cases with Stillbirths*

METHOD	NO OF CASES
Normal	64
Forceps	36
Version	13
Breech	16
Cesarean	4
Craniotomy	2
<b>Total</b>	<b>135</b>

methods other than that of normal delivery. In addition to the technic of delivery, the prenatal care of the mother had a strong bearing on the incidence of stillbirths. Many of the cases had maternal complications such as toxemia of pregnancy, placenta previa, premature separation of the placenta, diabetes, and so forth, and we wish to emphasize the importance of immediate hospitalization of such cases and the need for the aid of an expert consultant.

#### SUMMARY

An outline of the organization of the obstetric service of the Faulkner Hospital is presented, together with a summary of the results obtained in this department during the past fifteen years.

This resume demonstrates that, while the mortality rates are satisfactorily low, there are some

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#### REPORT OF A CASE

A 50-year-old housewife first admitted to the Faulkner Hospital in January, 1930, had suffered backache, bearing-down pain and prolapse of the uterus since the birth of her only child 22 years previously. She had undergone two operations for suspension, the last one in 1920. Both suspensions gave way within 6 months after returning to work. Catamenia had ceased 4 months previous to admission, without further menopausal symptoms.

The past history was not remarkable except for two operations for hyperthyroidism, in 1909 and in 1920.

Physical examination revealed a large, healthy woman with negative general findings except healed thyroid and median suprapubic scars. The perineum and cervix were badly lacerated and there was a marked prolapse of the uterus, the cervix extending to the vulva.

At operation, the cervix was amputated and the perineum repaired. The abdomen was opened, and the uterus was found to be retrocessed and to contain one small fibroid on the posterior surface. This fibroid was removed and the uterus firmly affixed to the anterior abdominal wall after denuding the fundus. (There was no evidence at this time of any break in the posterior cul-de-sac.) The wound was closed without drainage and the patient made an excellent convalescence.

In 1933 a check up revealed no evidence of return of the prolapse or any relaxation of the perineum.

The patient re-entered the hospital in May, 1937, complaining of pain in the back and right side and a sense of pulling down which she had noticed for 2 years. In the few months before admission she had felt some structure protruding from the vagina.

General physical findings were normal. Pelvic examination revealed a small, atrophic uterus attached well up in the anterior position. The perineum was normal anteriorly. Rectal examination showed what was interpreted as a prolapse of the rectum through the upper part of the posterior vaginal wall. The preoperative diagnosis was rectocele.

At operation, the perineum was denuded, exposing the protruding mass. With a finger in the rectum careful dissection showed that this was not a rectocele but a hernial sac with a narrow neck, whose origin lay just below the cervix. The sac contained small bowel, apparently ileum. This was reduced, the sac tied off at the neck and removed. The uterosacral ligaments were then sutured together in front of the stump. Excess mucous membrane was removed and the wound closed after bringing the peritoneal bed together a little more completely.

The patient felt immediately relieved of bearing-down pain, but right flank pain persisted during convalescence, gradually diminishing as strength was regained. On examination 18 months later the posterior vaginal wall was found to be in good condition with no evidence of recur-

rence of the hernia. A cystocele had developed, however, entirely independent of any effect of previous operations, and necessitated a simple anterior colporrhaphy.

This case illustrates many of the features of the typical posterior vaginal hernia. The symptoms are a bearing-down sensation and the feeling of a mass in the vagina. In cases with incarceration or strangulation of the intestine in the hernial sac, symptoms of obstruction are also present. The correct preoperative diagnosis could have been made here if the upper part of the vaginal floor had been examined more carefully both by vagina and rectum with this condition in mind. Because the previous rectocele repair had remained in good condition, there was not the marked bulging into the perineum which is often seen. A gurgling in the intestine in the hernial sac and collapse of the sac by reduction of its contents into the abdominal cavity are diagnostic signs which differentiate posterior vaginal hernia and rectocele or vaginal cyst. Differentiation from uterine prolapse should be difficult only when the two conditions are found together. This situation, however, is not infrequent.

In the present case the preceding prolapse of the uterus, necessitating three operations for suspension, the rectocele and the later cystocele exemplify the predisposing factor of weakness of the pelvic tissues. Parenthetically we might postulate that bringing the retrocessed uterus forward and affixing it to the anterior abdominal wall aided the formation of the hernia by allowing the intestine to press directly down on the bottom of the cul-de-sac of Douglas. As has been stated, no defect in the cul-de-sac was noted at the time of the abdominal operation.

The type of repair described here is the method devised by Ward<sup>10</sup>. Phaneuf<sup>8</sup> uses this for uncomplicated hernia, but when adhesions are present he advises the Moschcowitz intra-abdominal operation,<sup>11</sup> which was originated for the cure of prolapse of the rectum. This obliterates the cul-de-sac from above by a series of purse-string sutures. Such a method would seem to be the logical and necessary procedure in cases so complicated as to need abdominal operation.

#### SUMMARY

Posterior vaginal hernia is a rare condition but probably occurs more often than is recognized.

It may frequently be the cause of unsuccessful repairs of rectocele.

The true posterior vaginal hernia is a definite peritoneal sac with a neck and must be differentiated from elythrocele, in which there is a prolapse of the uterus accompanied by a bulging of ab-

aspects of the work that are open to improvement. Furthermore, it points out exactly how these changes are to be made.

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## POSTERIOR VAGINAL HERNIA

FRANCIS F CARY, MD,\* AND EDWARD L YOUNG, M.D.†

BOSTON

THIS paper is presented in order to call attention to a rather rare gynecologic condition simulating rectocele and uterine prolapse, which is frequently undiagnosed preoperatively and is occasionally unrecognized at operation for repair of the pelvic floor. It is often the cause of recurrence of what is apparently a simple rectocele.

Miles<sup>1</sup> has classified all protrusions of peritoneum into the pelvic tissues as pelvic hernias, and has subdivided them into the pudendal, perineal and vaginal types. In this paper the first two will not be discussed. Vaginal hernias are either anterior or posterior depending on whether they protrude between the bladder and vagina or the vagina and rectum. Posterior vaginal hernia has also been called in the literature hernia of the cul-de-sac of Douglas, enterocele and high rectocele, but these names are also used in describing conditions other than true vaginal hernia. A true posterior vaginal hernia is a definite peritoneal sac pushing down from the pouch of Douglas in the midline and dissecting between the rectum and vagina. The neck of the sac is located between the uterosacral ligaments just behind the top of the vagina, and through this, abdominal contents pass to form a mass which may bulge out through the vulva when the patient strains down.

Rectocele and uterine prolapse frequently accompany this condition but should be differentiated from it. Particularly is this true when there is a massive prolapse of the uterus and vaginal floor caused by an abnormally deep cul-de-sac. Reports of cases of vaginal hernia in the literature are confusing on this point. Miles<sup>1</sup> has clarified the issue as follows:

Some authors have classified both cystocele and rectocele as vaginal herniae, while by far the greater number of cases reported, on close analysis, turn out to be cases of prolapsus or descensus of the uterus accompanied by a bulging of abdominal contents into a distended cul-de-sac. In [this condition] there is no true vaginal hernial sac and no ring or

aperture through which the viscera herniate. The uterus descends because of stretched and attenuated cardinal and uterosacral ligaments, the cul-de-sac is enlarged and there is really a descent of the floor of the pelvis. This condition is properly termed clytocele or vaginal enterocele.

Jones<sup>2</sup> defined three types of deep cul-de sac and described the relation of each to the strength of the pelvic fascia. The first he called a congenital type in which the peritoneum dips into the pelvis, is smooth and closely lines the organs, flattening the rectum posteriorly and pushing forward the back of the uterus and cervix. The fascia in this group is of poor quality. The second type is also large and deep but the peritoneum lies in redundant folds over the pelvic viscera, which are not displaced by it. This is the acquired type, and the pelvic fascia is of fair strength. In the third type, which is rare, the fascia is generally good but there is a small opening between the vagina and rectum reaching from the posterior cul-de-sac, in normal position, down to the levators and usually causing a vaginal protrusion. It suggests a protrusion through a small defect in the fascia. The first two types are responsible for massive prolapse of the rectum or uterus, whereas the third group represents the basis for the true posterior vaginal hernia.

There is general agreement that three main factors lead to the development of a vaginal hernia: predisposition of weakness of the pelvic floor such as alluded to above and also accidents of parturition, intra-abdominal pressure of pregnancy, ascites or tumors, and sudden trauma such as childbirth, straining and lifting of weights. These are local applications of principles underlying all hernias.

Garengot reported a case of vaginal hernia two hundred years ago, and Sir Astley Cooper described the condition in his monograph on hernia in 1804, but actual numerical reports are few. In the literature up to 1932 Bueermann<sup>3</sup> found 76 cases sufficiently well defined to be called vaginal hernias. Of these, 56 were of the posterior type,

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This case illustrates many of the features of the typical posterior vaginal hernia. The symptoms are a bearing-down sensation and the feeling of a mass in the vagina. In cases with incarceration or strangulation of the intestine in the hernial sac, symptoms of obstruction are also present. The correct preoperative diagnosis could have been made here if the upper part of the vaginal floor had been examined more carefully both by vagina and rectum with this condition in mind. Because the previous rectocele repair had remained in good condition, there was not the marked bulging into the perineum which is often seen. A gurgling in the intestine in the hernial sac and collapse of the sac by reduction of its contents into the abdominal cavity are diagnostic signs which differentiate posterior vaginal hernia and rectocele or vaginal cyst. Differentiation from uterine prolapse should be difficult only when the two conditions are found together. This situation, however, is not infrequent.

In the present case the preceding prolapse of the uterus, necessitating three operations for suspension, the rectocele and the later cystocele exemplify the predisposing factor of weakness of the pelvic tissues. Parenthetically we might postulate that bringing the retrocessed uterus forward and affixing it to the anterior abdominal wall aided the formation of the hernia by allowing the intestine to press directly down on the bottom of the cul-de-sac of Douglas. As has been stated, no defect in the cul-de-sac was noted at the time of the abdominal operation.

The type of repair described here is the method devised by Ward<sup>10</sup>. Phaneuf<sup>8</sup> uses this for uncomplicated hernia, but when adhesions are present he advises the Moschcowitz intra-abdominal operation,<sup>11</sup> which was originated for the cure of prolapse of the rectum. This obliterates the cul-de-sac from above by a series of purse-string sutures. Such a method would seem to be the logical and necessary procedure in cases so complicated as to need abdominal operation.

#### SUMMARY

Posterior vaginal hernia is a rare condition but probably occurs more often than is recognized.

It may frequently be the cause of unsuccessful repairs of rectocele.

The true posterior vaginal hernia is a definite peritoneal sac with a neck and must be differentiated from elytrocele, in which there is a prolapse of the uterus accompanied by a bulging of ab-

aspects of the work that are open to improvement. Furthermore, it points out exactly how these changes are to be made.

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## POSTERIOR VAGINAL HERNIA

FRANCIS F CARY, M.D,\* AND EDWARD L YOUNG, M.D†

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THIS paper is presented in order to call attention to a rather rare gynecologic condition simulating rectocele and uterine prolapse, which is frequently undiagnosed preoperatively and is occasionally unrecognized at operation for repair of the pelvic floor. It is often the cause of recurrence of what is apparently a simple rectocele.

Miles<sup>1</sup> has classified all protrusions of peritoneum into the pelvic tissues as pelvic hernias, and has subdivided them into the pudendal, perineal and vaginal types. In this paper the first two will not be discussed. Vaginal hernias are either anterior or posterior depending on whether they protrude between the bladder and vagina or the vagina and rectum. Posterior vaginal hernia has also been called in the literature hernia of the cul-de-sac of Douglas, enterocele and high rectocele, but these names are also used in describing conditions other than true vaginal hernia. A true posterior vaginal hernia is a definite peritoneal sac pushing down from the pouch of Douglas in the midline and dissecting between the rectum and vagina. The neck of the sac is located between the uterosacral ligaments just behind the top of the vagina, and through this, abdominal contents pass to form a mass which may bulge out through the vulva when the patient strains down.

Rectocele and uterine prolapse frequently accompany this condition but should be differentiated from it. Particularly is this true when there is a massive prolapse of the uterus and vaginal floor caused by an abnormally deep cul-de-sac. Reports of cases of vaginal hernia in the literature are confusing on this point. Miles<sup>1</sup> has clarified the issue as follows:

Some authors have classified both cystocele and rectocele as vaginal herniae, while by far the greater number of cases reported, on close analysis, turn out to be cases of prolapsus or descensus of the uterus accompanied by a bulging of abdominal contents into a distended cul-de-sac. In [this condition] there is no true vaginal hernial sac and no ring or

aperture through which the viscera herniate. The uterus descends because of stretched and attenuated cardinal and uterosacral ligaments, the cul-de-sac is enlarged and there is really a descent of the floor of the pelvis. This condition is properly termed clytrocele or vaginal enterocele.

Jones<sup>2</sup> defined three types of deep cul-de sac and described the relation of each to the strength of the pelvic fascia. The first he called a congenital type in which the peritoneum dips into the pelvis, is smooth and closely lines the organs, flattening the rectum posteriorly and pushing forward the back of the uterus and cervix. The fascia in this group is of poor quality. The second type is also large and deep but the peritoneum lies in redundant folds over the pelvic viscera, which are not displaced by it. This is the acquired type, and the pelvic fascia is of fair strength. In the third type, which is rare, the fascia is generally good but there is a small opening between the vagina and rectum reaching from the posterior cul-de sac, in normal position, down to the levators and usually causing a vaginal protrusion. It suggests a protrusion through a small defect in the fascia. The first two types are responsible for massive prolapse of the rectum or uterus, whereas the third group represents the basis for the true posterior vaginal hernia.

There is general agreement that three main factors lead to the development of a vaginal hernia: predisposition of weakness of the pelvic floor such as alluded to above and also accidents of parturition, intra-abdominal pressure of pregnancy, ascites or tumors, and sudden trauma such as childbirth, straining and lifting of weights. These are local applications of principles underlying all hernias.

Garegeot reported a case of vaginal hernia two hundred years ago, and Sir Astley Cooper described the condition in his monograph on hernia in 1804, but actual numerical reports are few. In the literature up to 1932 Bueermann<sup>3</sup> found 76 cases sufficiently well defined to be called vaginal hernias. Of these, 56 were of the posterior type,

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and he added 2 more. Since then there have been sporadic reports of a handful of cases by Black,<sup>4</sup> Stearns,<sup>6</sup> McGuire and McGuire<sup>7</sup> and others. The total number can be said to come to less than 70. In 1937 Phaneuf<sup>8</sup> stated that he had encountered 38 cases of large hernia of the cul-de-sac of Douglas, but examination of the 5 cases described by him in this and a previous report<sup>9</sup> shows that most of these were not true posterior vaginal hernias but rather what Miles defined as elytrocele.

#### REPORT OF A CASE

A 50-year-old housewife first admitted to the Faulkner Hospital in January, 1930, had suffered backache, bearing-down pain and prolapse of the uterus since the birth of her only child 22 years previously. She had undergone two operations for suspension, the last one in 1920. Both suspensions gave way within 6 months after returning to work. Catamenia had ceased 4 months previous to admission, without further menopausal symptoms.

The past history was not remarkable except for two operations for hyperthyroidism, in 1909 and in 1920.

Physical examination revealed a large, healthy woman with negative general findings except healed thyroid and median suprapubic scars. The perineum and cervix were badly lacerated and there was a marked prolapse of the uterus, the cervix extending to the vulva.

At operation, the cervix was amputated and the perineum repaired. The abdomen was opened, and the uterus was found to be retrocessed and to contain one small fibroid on the posterior surface. This fibroid was removed and the uterus firmly affixed to the anterior abdominal wall after denuding the fundus. (There was no evidence at this time of any break in the posterior cul-de-sac.) The wound was closed without drainage and the patient made an excellent convalescence.

In 1933 a check up revealed no evidence of return of the prolapse or any relaxation of the perineum.

The patient re-entered the hospital in May, 1937, complaining of pain in the back and right side and a sense of pulling down which she had noticed for 2 years. In the few months before admission she had felt some structure protruding from the vagina.

General physical findings were normal. Pelvic examination revealed a small, atrophic uterus attached well up in the anterior position. The perineum was normal anteriorly. Rectal examination showed what was interpreted as a prolapse of the rectum through the upper part of the posterior vaginal wall. The preoperative diagnosis was rectocele.

At operation, the perineum was denuded, exposing the protruding mass. With a finger in the rectum careful dissection showed that this was not a rectocele but a hernial sac with a narrow neck, whose origin lay just below the cervix. The sac contained small bowel, apparently ileum. This was reduced, the sac tied off at the neck and removed. The uterosacral ligaments were then sutured together in front of the stump. Excess mucous membrane was removed and the wound closed after bringing the peritoneal bed together a little more completely.

The patient felt immediately relieved of bearing-down pain, but right flank pain persisted during convalescence, gradually diminishing as strength was regained. On examination 18 months later the posterior vaginal wall was found to be in good condition with no evidence of recur-

rence of the hernia. A cystocele had developed, however, entirely independent of any effect of previous operations, and necessitated a simple anterior colporrhaphy.

This case illustrates many of the features of the typical posterior vaginal hernia. The symptoms are a bearing-down sensation and the feeling of a mass in the vagina. In cases with incarceration or strangulation of the intestine in the hernial sac, symptoms of obstruction are also present. The correct preoperative diagnosis could have been made here if the upper part of the vaginal floor had been examined more carefully both by vagina and rectum with this condition in mind. Because the previous rectocele repair had remained in good condition, there was not the marked bulging into the perineum which is often seen. A gurgling in the intestine in the hernial sac and collapse of the sac by reduction of its contents into the abdominal cavity are diagnostic signs which differentiate posterior vaginal hernia and rectocele or vaginal cyst. Differentiation from uterine prolapse should be difficult only when the two conditions are found together. This situation, however, is not infrequent.

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The type of repair described here is the method devised by Ward.<sup>10</sup> Phaneuf<sup>8</sup> uses this for uncomplicated hernia, but when adhesions are present he advises the Moschowitz intra-abdominal operation,<sup>11</sup> which was originated for the cure of prolapse of the rectum. This obliterates the cul-de-sac from above by a series of purse-string sutures. Such a method would seem to be the logical and necessary procedure in cases so complicated as to need abdominal operation.

#### SUMMARY

Posterior vaginal hernia is a rare condition but probably occurs more often than is recognized.

It may frequently be the cause of unsuccessful repairs of rectocele.

The true posterior vaginal hernia is a definite peritoneal sac with a neck and must be differentiated from elytrocele, in which there is a prolapse of the uterus accompanied by a bulging of ab-

dominal contents into a distended cul-de-sac of Douglas

Only 70 cases of true posterior vaginal hernia are to be found in the literature

An additional case is reported which exemplifies many of the typical aspects of symptomatology, etiology, differential diagnosis and treatment of this condition

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## CASE RECORDS OF THE FAULKNER HOSPITAL

### Antemortem and Postmortem Records as Used in Monthly Clinicopathological Conferences

Directed by J BEACH HAZARD, M.D

#### CASE 6389

##### PRESENTATION OF CASE

*First Admission* A sixty-four-year-old, American housewife was admitted complaining of nausea and vomiting

Three years preceding entry she began to have attacks of upper abdominal distress Vomiting frequently occurred after eating the first two or three mouthfuls of any meal, but after this she could usually return and finish eating without further symptoms At times she was free from these attacks for several months Before entry, an x-ray examination of the upper gastrointestinal tract showed abnormal activity of the esophagus, but no delay in the passage of barium, no lesion was demonstrated The stomach and duodenum were normal A Graham test was negative Flat abdominal films were negative, except for a prominent splenic shadow The spine showed evidence of hypertrophic arthritis Two weeks before entry there had been an acute onset of abdominal distress after eating a rich meal For several days following this she noticed marked weakness, and examination at the end of this time revealed generalized abdominal distention with increased peristalsis but no tenderness During this day two loose bowel movements occurred, which were accompanied by generalized abdominal cramps About a week preceding admission, definite upper abdominal tenderness was noted, and the blood white-cell count was 10,000 Her nausea continued and on one occasion she stated that she had vomited material of coffee-ground character

The basal metabolic rate was determined two years before entry and was found to be -13 per cent She was given thyroid extract but had vol-

untarily omitted it some months before admission Her general health had otherwise been good There had been no operations She had had the usual diseases of childhood but no diphtheria or scarlet fever The menopause had occurred about two years preceding admission Her weight had been constant

The family history revealed that her mother died at the age of forty-eight of cancer Her father died of hypertension Three siblings were living and well One aunt died of cancer

Physical examination revealed an obese individual with a dry skin, which was thickened and firm in texture The pupils were equal and reacted regularly The tongue was clean Her throat appeared somewhat injected There was no general enlargement of the lymph nodes Examination of the lungs was negative The heart was slightly enlarged, and there was a soft systolic murmur, the sounds were regular The abdomen was distended and hyperresonant, and presented marked peristalsis, there was definite spasm and tenderness and a questionable mass in the right upper quadrant The liver and spleen were not palpable The extremities were negative.

The temperature was 98.4°F, the pulse rate 84, and the respirations 20 The blood pressure was 178 systolic, 88 diastolic

The urine was negative except for a specific gravity of 1.038 The blood white-cell count was 12,700 with 77 per cent polymorphonuclears The red-cell count was 5,100,000 with a hemoglobin of 100 per cent (Sahli) The blood smear appeared normal A stool specimen was brownish green, with a 1+ benzidine test

An x-ray examination made one week after admission showed a normal esophagus and stomach



There was some undue irritability of the duodenum and sigmoid colon. The Graham test was again negative.

During her stay in the hospital the patient's temperature showed an afternoon rise to 99 or 100°F. The tenderness in the right upper quadrant was present intermittently, and at the end of the first week she had some tenderness to the left of the epigastrium on deep pressure. There was soreness across the back, which at times was severe, and also a variable amount of abdominal distress, particularly after the evening meal. Vomiting occurred once or twice daily, and at one time amounted to 800 cc. The vomitus contained no gross blood. Sodium bicarbonate had been administered in 10-gr doses with little relief, and  $\frac{1}{4}$  gr of morphine was given almost daily.

The white-cell count remained between 10,000 and 12,000. Ten successive stool examinations showed the specimens to be yellowish-brown, with only two showing a positive benzidine test.

Abdominal tenderness at the time of discharge, two weeks after admission, had almost entirely disappeared.

*Second Admission* (two years later) The patient was readmitted because of vomiting.

She had continued to vomit the first two or three mouthfuls of almost every meal and then to eat normally. About two weeks before entry she began to have epigastric distress, coming on about two hours after meals and usually relieved by soda. There was also low precordial pain, which radiated to the left shoulder and down the left arm and was brought on by exertion. The original attack of pain followed a heavy meal and necessitated her sitting down for some time. She was placed on a fairly strict Sippy regime, with immediate relief for forty-eight hours, followed by a recurrence of symptoms.

Physical examination showed a pale woman in some distress, lying quietly in bed. The heart sounds were regular and of good quality, with a systolic murmur at the apex and an accentuated A<sub>2</sub>. The abdomen was distended and tympanitic, with slight tenderness in right and left upper quadrants, but no mass or spasm. Ophthalmoscopic examination showed moderate sclerotic changes of the retinal vessels, but no exudate or hemorrhage. Physical examination was otherwise negative.

The temperature was 99.2°F., the pulse rate 72, and the respirations 24. The blood pressure was 120 systolic, 80 diastolic.

Urinalysis showed a slight trace of albumin and a very rare erythrocyte. The blood white-cell count

was 11,550 with 78 per cent polymorphonuclears, and the red-cell count 5,000,000 with a hemoglobin of 101 per cent (Sahli). A nonprotein nitrogen was 39 mg per 100 cc, and a blood sugar 129 mg. A blood Hinton test was negative.

A gastrointestinal series disclosed a dilated stomach, which was almost completely obstructed. Six hours after the meal only a small amount of barium was seen scattered throughout the small bowel. The obstruction was beyond the sphincter, which was well differentiated. During the examination just enough barium entered the duodenum to identify the base of the cap. The rest of the gastrointestinal tract showed no abnormality.

During her stay she vomited on several occasions, two of the specimens examined showing a 1+ benzidine test. She had been admitted chiefly for x-ray studies and was discharged seventy-two hours after admission.

*Final Admission* (fifteen months later) The patient was readmitted because of vomiting.

Since the previous admission she had been at home on a strict Sippy diet. She continued to vomit the first portion of many meals and occasionally after meals, but there was little distress. At times there was precordial pain with radiation down the left arm, usually relieved by nitroglycerin. She had gained weight. X-rays taken about one year previous to admission showed a constricted area of irregular contour in the esophagus opposite the ninth and tenth dorsal vertebral bodies and measuring 4 cm in length. The first portion of the duodenum showed spasm, but the stomach emptied at a normal rate. Three months before entry she was put to bed because symptoms of abdominal distress became more severe and were accompanied by pain in the left upper quadrant. For about a month preceding entry severe retching and vomiting occurred, sometimes with the production of blood-streaked material. X-ray films taken two months preceding admission showed the esophagus to measure 3 cm in width above the constricted zone. The mucosal pattern appeared to continue through the defect. The stomach was small and hypertonic, and the duodenal cap showed constant deformity but no crater. Pain in the left upper quadrant continued, and a palpable mass was noted in that vicinity. She was admitted because of the increased intensity of symptoms.

The patient's color appeared good, and the skin was dry. The left border of the heart was percussed at the nipple line, there was a blowing systolic murmur, but no diastolic murmur, and A<sub>2</sub> was slightly greater than P<sub>2</sub>. The abdomen was soft and symmetrical. There were points of

tenderness under the left costal margin and in the right lower quadrant. In the latter region there was a small indefinite mass, which could be moved. The spleen was thought to be palpable, but the liver edge was not felt.

The temperature was 98°F, the pulse rate 67, and the respirations 14. The blood pressure was 120 systolic, 68 diastolic.

Urinalysis showed a slightest possible trace of albumin and sugar, and the sediment contained frequent erythrocytes. Acetone was present, but no diacetic acid. The blood white-cell count was 5000 with 60 per cent polymorphonuclears, and the red-cell count 3,600,000 with a hemoglobin of 75 per cent (Sahli). The smear appeared normal. A blood sugar was 153 mg per 100 cc. A stool on the second day after entry was light brown and gave a 3+ benzidine test.

After admission the patient was kept quietly in bed and given intravenous glucose once or twice daily. Water in sips by mouth was attempted, but promptly caused vomiting. The vomitus at one examination showed a free hydrochloric acid of 40 units. Seven specimens showed from 2+ to 4+ benzidine tests. The mass in the right lower quadrant moved up to the right upper quadrant, and then disappeared. Substernal pain was sometimes relieved by nitroglycerin, but morphine was required in frequent doses. Each time she was seen by her husband or any member of her family or by her physician, nausea and vomiting were precipitated. On the twelfth day after entry a bedside film of the chest and upper abdomen, taken following the ingestion of a small amount of barium, showed most of the barium in the stomach with a small amount scattered through the lower half of the esophagus. Two centimeters above the diaphragm there was an area of narrowing of the esophagus, extending upward about 4 cm. There was no dilatation of the esophagus above. A film twenty-four hours later showed the stomach empty, and the barium scattered through the proximal colon. During the last week of stay the patient vomited dark coffee-ground material, a small nasal tube was passed into the stomach, and about 2000 cc of bloody material removed. On the seventeenth day after entry her pulse became imperceptible, and she died quietly.

#### DIFFERENTIAL DIAGNOSIS

DR WILLIAM B BREED. This patient's history extends through a period of about five years and three months, during which time she came into this hospital three times. Her symptoms were referable to the gastrointestinal tract, varied greatly from time to time, and were periodic. My first

thought is that there must have been some diffuse process which affected the esophagus, the stomach, the duodenum and perhaps other portions of the gastrointestinal tract. Her symptoms at the beginning suggest cardiospasm and possibly a diaphragmatic hernia, which later is ruled out. Then there are symptoms of pylorospasm with complete obstruction. There follows a period during which the stomach acted well, food passing readily through it. Recorded in the history and also in the physical examination is a very interesting series of observations, namely "fleeting" masses in the abdomen, first in the right lower quadrant, then in the left lower quadrant, and again in the right upper quadrant. No localized process would produce such a picture. Before defending one diagnosis I should like to ask the roentgenologist whether he can say definitely that this woman did not have esophageal varices at any time.

DR MAGNUS I SMEDAL. I never saw them.

DR BREED. In the description such a finding was not suggested. If she did have esophageal varices it might lead us toward a diagnosis of cirrhosis of the liver, or thrombosis of the splenic vein with esophageal varices. Your report makes me reasonably confident in ruling out these diagnoses.

The one diagnosis I wish to place before you for consideration is a radiosensitive tumor of the lymphoma group. This, it is true, does not explain the symptoms referable to her heart, which I believe were due to arteriosclerotic heart disease with coronary disease.

You will note that every time she came into the hospital and had x-ray studies she was better and went home for a period of months. I have heard of cases that are so sensitive to x-ray that the process will subside and allow normal function to go on, even after only diagnostic exposure. Now, is it true that she had had no x-ray treatment? Do you know how many times she was x-rayed?

DR F WILLIAM MARLOW, JR. She was x-rayed at least five times but had had no x-ray therapy.

DR BREED. She had this diffuse process in her gastrointestinal tract. I have tried to explain it on various other grounds. I do not think she had carcinoma. She lived for five and a half years and did not lose weight. From time to time her symptoms subsided without any particular form of treatment other than diet and rest. During the two years she was at home between the first and second admissions and the fifteen months between the second and third, she improved directly after she left the hospital. Of course there is no question but there was a psychogenic element here, but she did not die of psychoneurosis! Furthermore, psychoneurosis does not produce

lumps in the abdomen from time to time I should like to go over the films with Dr Smedal

DR. SMEDAL Here are representative films of several examinations

Four years before the final entry Dr Sidney L Morrison said he could find only an irritable duodenum, the rest of the gastrointestinal tract being negative We have no films from the first examination five and a half years before admission at which some irritability of the esophagus was reported Two years later she had this dilated stomach, with marked peristalsis and practically complete obstruction just at the duodenal cap The barium in the colon is the residue from a barium enema done the day before After six hours, there was almost no barium in the small bowel A film one year before final entry showed a narrowing in the lower third of the esophagus, which was persistent at all times The final film taken one year later with a portable machine after the patient had had a small amount of barium showed no obstruction at the lower end of the esophagus

DR. BREED The obstruction at the pylorus disappeared completely?

DR. SMEDAL Yes

DR. BREED Of course she could have had a duodenal ulcer which improved on a Sippy diet at home, but this transient obstruction of the pylorus I cannot understand It certainly is hard to explain on a psychogenic basis I think cancer in any portion of the gastrointestinal tract, in the pancreas or in any other place seems a remote possibility She may have had an ulcer of her duodenum, but I cannot see how an ulcer there would explain the esophageal lesion or the appearance and disappearance of masses in her abdomen I wonder if it would not be possible to find out a little more about the nature of these masses I was in doubt as to just what they were Were they hard masses? Were they movable? Were they tender?

DR. MARLOW We thought the masses were fecal

DR. BREED I cannot explain the esophageal symptoms or the x-ray picture of the esophagus on the basis of an ulcer unless she had an ulcer in her esophagus as well as in her duodenum Could you say that the defect is an ulcer of the esophagus, Dr Smedal?

DR. SMEDAL X-ray films during her hospital stay showed no esophageal lesion Dr Morrison demonstrated an esophageal lesion at an office visit several months later

DR. SIDNEY L MORRISON At the time I examined her the stricture was constant I thought there was some irritability of the esophagus It

did not look irregular enough to say that it was cancer, and yet I did not dare to say it was not cancer on a single examination At one time I wondered if there was not an extra-esophageal lesion, but I was unable to demonstrate it I said it could be a stricture or it could be cancer, and requested another examination I examined her for a long time because I could not satisfy myself that the lesion was a malignant neoplasm

DR. MARLOW Here is Dr Morrison's report at the time "There is a constricted area in the lower third of the esophagus which is rather rigid, that is, it would not dilate either with thick or thin barium There was quite a bit of cardiospasm"

DR. BREED After this examination, with considerable exposure to x-ray, did she improve?

DR. MARLOW Yes She got well enough to go abroad and to stay there from early summer up until the following Thanksgiving, when, just before going to visit some friends, she had a recurrence of symptoms that persisted practically until the time she died An x-ray film was taken two months before she died, and at that time the esophagus was dilated, measuring 3 cm in width in its middle third There was marked irregular narrowing in the lower third about 8 cm above the cardia

DR. BREED Let us take up the question of whether or not this is cancer of the esophagus Three years before her first admission the story was one referable to the esophagus, and I should think it almost inconceivable that cancer in the lower third of the esophagus could be of as long a duration as that, with periods of remission I cannot explain this on any basis other than that the lesion was some diffuse, non-epithelial tumor which may have been very sensitive to x-rays, probably a lymphoma

DR. MARLOW During the five years before her death she never had a blood count less than 5,500,000 or a hemoglobin less than 80 per cent (Sahli), and all differential counts were normal

DR. BREED That only strengthens the impression that she did not have cancer

DR. EDWARD L YOUNG I saw her two or three times in consultation with Dr Marlow The first time I thought she had gall-bladder disease and a psychoneurosis, the second time my diagnosis was duodenal ulcer with a neurosis, and the third time I believed the whole picture was psychoneurotic Since she died, the last diagnosis is undoubtedly wrong The early part of her illness might have been caused by ulcer, and the last part by cancer That would explain the symptoms as I see them

A PHYSICIAN I should like to ask Dr Breed if the fact of her vomiting after the first two or

three mouthfuls and then going back and eating a whole meal is not characteristic of hysterical vomiting, and I should also like to ask if it is possible that she might have died through starvation of psychogenic origin

DR BREED I agree that the first part of the story is very suggestive of cardiospasm of psychogenic origin. As to her death, she did bleed a good deal and they removed 2000 cc of bloody material at the end, furthermore, she had occult blood from time to time in her stools. It is true that lymphomas of the intestine do not usually bleed profusely.

DR MARLOW Dr Breed suggested a diagnosis that we did not think of during five years. She did not lose weight until a short time before she came into the hospital and that was explained because she had taken practically nothing by mouth for from three to six weeks. She would get a little relief for several days on a very strict Sippy diet, and as soon as the slightest attempt was made to increase it, she promptly obstructed and began to vomit. We went through about the same mental distress that Dr Breed has.

She died of hemorrhage, her pulse becoming gradually weaker and then suddenly stopping. I support my finding of a palpable spleen by the fact that two other people examined her and came to this same conclusion. It was also reported to be enlarged by x-ray.

I think part of the reason for the difficulty in diagnosis was the fact that she was a difficult woman from whom to obtain a history and one could not really tell whether her pain was anginal or due to a simple ulcer. Finally, after persistent questioning, a history of two definite types of pain was extracted.

#### CLINICAL DIAGNOSES

Cancer or ulcer of the esophagus  
Duodenal ulcer  
Coronary disease

#### DR BREED'S DIAGNOSES

Diffuse non-epithelial tumor of the esophagus, probably lymphoma  
Coronary disease  
Arteriosclerosis

#### PATHOLOGICAL DIAGNOSES

Chronic peptic ulcer of esophagus, with hemorrhage  
Chronic duodenal ulcers  
Healed and healing infarct of myocardium, secondary to arteriosclerotic occlusion of circumflex branch of left coronary artery and more recent arteriosclerotic and thrombotic occlusion of right coronary artery

#### PATHOLOGICAL DISCUSSION

DR J BEACH HAZARD May I first apologize for inserting such a detailed picture of the fleeting abdominal masses. My only excuse is they were described in detail in the record. They were not present at autopsy, and the assumption of their being scybala is probably correct. The defect in the esophagus was a peptic ulcer, 5 by 3 cm, it had extended to the periesophageal fat tissue but had not caused a mediastinitis. The ulceration was located just above the cardia and almost encircled the esophagus. In the ulcer bed there was a zone of extensive hemorrhage. Fresh blood was present in the esophagus, and there was 500 cc of coffee-ground fluid in the stomach. There were three duodenal ulcers adjacent to the pylorus, and 3 cm distal to these was a deep ulcer which extended through the duodenal wall, though it had not perforated into the peritoneal cavity.

To explain the pain down the arm, old and recent infarctions in the posterior wall of the myocardium were found. There was also an old occlusion of the left circumflex coronary artery, and a more recent occlusion of the right coronary artery.

Esophageal ulcers are relatively rare, and when they do occur, are often associated with gastric or duodenal ulcers. The pain is usually referred to the lower substernal region, and the lesion is often mistakenly judged to be duodenal in location.

#### CASE 6390

##### PRESENTATION OF CASE

A seventy-eight-year-old retired business man was admitted with the chief complaints of abdominal pain and diarrhea.

About nine weeks preceding entry he developed pain in the epigastrium, which was described as "pressure or gas pain" and lasted twenty-four hours. There was no vomiting. For a short time following this he felt fairly well except for occasional attacks of "gas pains." A second attack of epigastric pain occurred about eight weeks before admission and was accompanied by nausea, vomiting and a feeling of feverishness. It was followed by diarrhea. He went to bed for four weeks and felt sufficiently weak to have a nurse in attendance. During the month preceding admission he experienced occasional epigastric pain with, at times, some diarrhea. No blood was noted in the stools. The pain was said to occur occasionally about half an hour after eating but was not regular. An x-ray examination was made four weeks before entry. The gall bladder contained one gallstone (about 2.5 cm in diameter) and showed no ex-

cretion of dye. The liver was of normal size. A barium meal showed a negative stomach with normal emptying time. There was also a slight irregularity of the duodenum, which was interpreted as probably due to adhesions. There was no obstruction in the small intestine. The colon showed normal motility. The cecum was rather low in position, and some of the films gave evidence of pressure on the cecum. Ten days later a re-examination of the large intestine with barium enema and fluoroscope showed a filling defect in the cecum on the medial aspect, which apparently extended posteriorly. It was interpreted by one observer as being a mass pressing on the cecum. There was no evidence of obstruction by the mass either in the ileum or the colon.

The patient had always been in good health. There had been no operations or injuries. His family history was noncontributory.

Physical examination revealed a well-developed and nourished man in generally fair condition. There was no generalized enlargement of the lymph nodes. Examination of the chest and lungs was negative. A mass approximately 15 by 15 cm was present in the right lower quadrant of the abdomen. This was slightly tender along its lower border. The surface seemed smooth, with a somewhat irregular area on its inferior aspect. It was partially movable. Rectal examination showed a somewhat enlarged prostate.

The temperature was 97.8°F, the pulse rate 80, and the respirations 20. The blood pressure was 144 systolic, 96 diastolic.

A urine specimen was of acid reaction, had a specific gravity of 1.014 and contained a slightest possible trace of albumin, no sugar, no casts, no red blood cells, 2 to 3 white blood cells per high-power field, and occasional epithelial cells. The blood white-cell count was 9250 with 66 per cent polymorphonuclears, the red-cell count 4,600,000 with a hemoglobin of 83 per cent (Sahli). A smear showed slight anisocytosis and apparently normal platelets. A stool specimen gave a negative benzidine test. The blood nonprotein nitrogen was 38 mg per 100 cc, the blood sugar 93 mg., and the blood Hinton test negative.

After admission the patient was comfortable without medication. The temperature ranged from 97 to 99.5°F, and on the third day an abdominal operation was performed. Examination of the abdomen under anesthesia showed the mass in the right lower quadrant to be quite movable.

#### DIFFERENTIAL DIAGNOSIS

DR EDWARD L. YOUNG. We have here a clean-cut picture of an elderly man who was apparently well until nine weeks before admission, and then

developed several attacks of epigastric pain and some diarrhea and came in with a mass in the right lower quadrant. The latter was something definite and so must be labeled. What data are there to aid us? The description of the pain will fit almost anything that is involving the mesentery of the small intestine in the right lower quadrant. I believe the fact the pain was epigastric means that the mass involved the peritoneum or mesentery in the neighborhood of the small bowel and that it was not an intrinsic cecal lesion. Diarrhea merely indicates irritation in the bowel. We see it occasionally in inflammations and at times with neoplasms. Nevertheless, I believe that if there was an intrinsic neoplasm of this size associated with diarrhea the stool should have contained either gross or occult blood. The x-ray studies also aid us in ruling out a neoplasm within the cecum. I do not believe a cancer of the cecum could be so large as this mass apparently was without there being gross or microscopic blood in the stools, an anemia or conclusive x-ray evidence of the lesion. It seems to me we must make a diagnosis other than that of neoplasm.

If it is not that, and of course at the age of seventy-eight a neoplasm is the thing one thinks of first, what can it be? Has the gallstone anything to do with it? I doubt it very much, unless the gall bladder with its contained stone is fixed in the right lower quadrant and produces the palpable mass. I once explored a mass in the right lower quadrant which I decided must be an appendiceal abscess because there was epigastric pain shifting to the right lower quadrant, but I found a gangrenous gall bladder containing a stone. However, this mass in the right lower quadrant is rather large for that of a gall bladder.

Is it possible we have some other rare condition? We must remember that, at the age of seventy-eight, appendicitis is always apt to be atypical. It is in children and old people that the diagnosis of acute appendicitis is most often missed. The symptoms and signs are so atypical that rupture may occur while the patient is being watched. There is not the commensurate tenderness or spasm one is accustomed to find. I believe it is possible that this man might have had an appendiceal abscess. The fact the mass was movable does not rule out this diagnosis.

What else could it be? One thinks of the various weird things he has seen and wonders if this is another. Of course, there is the gangrenous appendix epiploica, and also diverticulum of the cecum with abscess formation. Even foreign body in the omentum must be considered. I remember taking out a mass only a couple of years ago which turned out to be a toothpick which the

patient had swallowed several months previously. It came out of the wall of the cecum, and I took it out of a large mass in the omentum. That, however, is not likely here.

Could it be intussusception? He had had barium by mouth as well as by rectum, and I believe there would have been evidence of this lesion in the x-ray. Regional ileitis is uncommon at this age. How about a retroperitoneal lipoma? They occur not infrequently, arising in the mesentery or retroperitoneal fat tissue, generally in the former, and may grow to a large size. It should not be as freely movable as this is said to have been because it is usually somewhat fixed to the posterior abdominal wall. Could it be urticaria of the cecum, with marked thickening of the bowel wall? It has been described, though I have never seen it. Is there anything to suggest sepsis? I have already said that at his age he would have had atypical symptoms, so that the temperature of only 99.5°F and the lack of leukocytosis do not eliminate infection. Tuberculosis I have not mentioned. Of course it occurs as a mass, but generally not at the age of seventy-eight and not coming on as acutely as this did. The same is true of mesenteric adenitis.

It seems to me the facts that he had had epigastric pain, that these symptoms came on in attacks, that he was apparently free of trouble until a very short time before admission, that he had no anemia and that the x-ray films suggest something outside the bowel all point to either an appendiceal abscess or some rare disease, such as retroperitoneal lymphosarcoma, which occasionally produces a picture such as this. I do not believe the mass could be connected with the urinary tract.

I am going to say appendiceal abscess first, and some unusual type of tumor second. When I operated I should have been ready to shift either way, depending on what was uncovered in the right lower quadrant of the abdomen.

DR CHANNING FROTHINGHAM: Would you not expect an appendiceal abscess of that size to be fairly well fixed?

DR YOUNG: Yes, but I have seen one that was very movable.

DR SIDNEY L. MORRISON: On looking at these x-ray films, I believe the mass is situated posteriorly and medially in the wall of the cecum. The surface seems too smooth for a carcinoma.

DR YOUNG: I have seen a freely movable mass that was due to chronic intussusception, but I should have suspected that the barium by mouth

would have shown evidence of such a lesion. Is that a fair assumption?

DR MORRISON: I should say so.

DR YOUNG: Another thing that would help rule out intussusception is the absence of occult blood in the stool.

A PHYSICIAN: Would you consider thrombosis of the mesenteric vessels?

DR YOUNG: I do not believe that there would be such a large mass, nor would the patient go nine weeks without presenting a more serious situation, even with intermittent thrombosis.

A PHYSICIAN: Is not an omental cyst to be considered?

DR YOUNG: It is too low for an omental cyst, considering the size of the mass. That is one reason why I rule out torsion of the omentum. I have never seen a cyst of the mesentery of the bowel in that location.

DR MORRISON: If it is in the wall of the cecum, it could not be an omental cyst.

#### CLINICAL DIAGNOSES

Lymphoblastoma?

Carcinoma of cecum?

Old appendiceal abscess?

#### DR EDWARD L. YOUNG'S DIAGNOSES

Appendiceal abscess?

Retroperitoneal lymphosarcoma?

#### PATHOLOGICAL DIAGNOSIS

Hodgkin's disease of the cecum, sarcoma type

#### PATHOLOGICAL DISCUSSION

DR J. BEACH HAZARD: At operation a segment of intestine was removed which included 15 cm of terminal ileum and 30 cm of the cecum and colon. The tumor was located in the cecum, encircling the ileocecal valve and replacing the cecal wall posteriorly and medially over an area approximately 10 by 8 cm. On section the tissue was of white "fish-flesh" appearance and formed a mass up to 7 cm in thickness. On the mucosal aspect it was evident as large, rounded, relatively smooth-surfaced projections. Histologically it was of cellular structure with a predominance of medium-sized round cells and with occasional cells of the Sternberg type. The regional lymph nodes were partly replaced by tumor. The diagnosis of Hodgkin's sarcoma was made.

The patient died one year after operation, but no autopsy was obtained.

## REPORT ON MEDICAL PROGRESS

### PSYCHIATRY

A WARREN STEARNS, MD \*

BOSTON

IN a general way, progress in the field of psychiatry during the year 1938 consisted in further development of work which had already begun in previous years. By far the most important development is the so-called shock treatment for dementia praecox and other psychoses. Readers have frequently been informed of the tremendous damage done by mental disease—one bed for mental disease for each bed for all other diseases in America. Of those cases accumulating in state hospitals roughly 75 per cent have been diagnosed dementia praecox, latterly called for reasons not too obvious, schizophrenia.

Until recently these cases presented a very hopeless picture. Occupational therapy, physiotherapy and other empirical procedures were largely palliative, and no specific attack was made on the diseased process itself. Organicists and psychogenesists vied with each other in elaborating the minutiae brought forth by their endeavors, but no one really claimed to understand the cause, nature or cure of this dread malady.

Then came the insulin-shock treatment, empirical to be sure, but opening up leads and hopes heretofore unknown. Following this, came the use of various other convulsants, especially Metrazol. All of this has had a tremendously invigorating effect on the whole field of psychiatry. Whereas one often sent patients to state hospitals solely for care, it has now become possible to think in terms of treatment. During the past year there have been a number of excellent publications, some of them dealing with large numbers of carefully treated cases. Compared with the roughly 20 per cent of remissions in untreated cases of dementia praecox, with insulin the incidence of such remissions of cases of less than one year's duration has varied from 50 to 85 per cent.<sup>1</sup> Conservative psychiatrists have hesitated to speak of cures, but there is a note of optimism in most of these reports. Similar results have been obtained with the use of Metrazol. Each has its advocates and it is not yet possible to decide between rival claims.<sup>2, 3</sup>

This work is not only of importance in the very practical matter of relief of patients, but its implications concerning the nature of mental disease are of fundamental importance. It has enlivened

state-hospital medicine in a very hopeful way. Incidentally, recent reports of the use of Metrazol in involutional depressions appear even more promising, some persons reporting 100 per cent of cures, after a relatively short period of treatment. As the year closes, this work is being extended in scope and area.<sup>4</sup>

Of less practical importance, but theoretically illuminating, is the work which has been done in the study of "brain waves." The passage of electrical currents through the brain results in certain conventional findings. These vary under certain conditions and especially in various mental diseases. The work promises to increase our understanding of impaired mental function, and certain investigators appear to be able to localize organic lesions by this method. It would seem at this time safe to assume that it will be an important aid in localizing brain tumors.<sup>5, 6</sup>

There has been further work in the application of experimental pharmacology to the field of psychiatry. Contemporary with certain physiological and chemical concepts concerning the autonomic nervous system, studies have been made of the effect of certain drugs in stimulating and inhibiting the complicated apparatus having to do with the emotional life of individuals, both sick and well.<sup>7, 8</sup> The drug, amphetamine (Benzedrine) sulfate, has been found useful in treating certain psychic states. While psychological studies have continued, the above appears to indicate a trend in the development of psychiatry toward the chemical and physiological rather than the psychological. It seems to bring the field of psychiatry a little closer to that of general medicine.

There has been a continued effort to stimulate the teaching of psychiatry in medical schools. Many data have been collected and published tending to show the relative importance of mental states in the field of medicine and their neglect by medical educators. As a result of these efforts there are many evidences of more time's being given in medical schools to psychiatry and related subjects.<sup>9, 10</sup>

Sociological disciplines have been invoked to an increasing extent as an aid to the understanding of certain psychiatric problems. The field of child guidance has been especially illuminated. A few years ago when dealing with problem children a good deal of attention was given to psychological

patient had swallowed several months previously. It came out of the wall of the cecum, and I took it out of a large mass in the omentum. That, however, is not likely here.

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The patient died one year after operation, but no autopsy was obtained.



CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25171

## PRESENTATION OF CASE

A forty-three-year-old, white, married bank officer was admitted complaining of frequency of six months' duration.

For several years he had had to micturate about every two hours during the day. He had been impotent for nine months. His frequency had gradually increased during the previous six months, occurring some days as often as every twenty minutes. There was no difficulty in starting the flow, but the stream lacked force and he was unable to empty the bladder. After completion of urination dribbling occurred for several minutes. He had nocturia once each night. Occasionally there was uncomfortable burning on micturition, but there had been no hematuria or pyuria. There was no history of venereal disease. He had an aching sensation in the sacroiliac region, not aggravated by motion and never radiating, it was the same night and day, causing no incapacity, only discomfort. A year before admission he began having attacks of non-radiating pain about 2.5 cm to the right of the umbilicus. The pain persisted several hours, without anorexia, nausea or change in bowel habits. He had had several such episodes, two occurring during the week prior to entry. The pain was not affected by motion, food or alkalies. He had occasional episodes of gross bleeding by rectum, not always associated with tenesmus, although he knew that he had had hemorrhoids for several years. On several mornings he noted blood stains on his undergarments, presumably coming from the anus. He had had no tarry or mucoid stools and no change in bowel habits. His past and family histories were non-contributory.

Physical examination showed a well-developed, thin man in no distress. The fundi showed blurring of the disk margins. The teeth showed marked caries. The right posterior cervical lymph nodes were slightly enlarged, firm and matted. Examination of the chest was negative. The blood pressure was 115 systolic, 80 diastolic. The right kidney was palpable and tender. On deep palpation a firm, tender mass was encountered in both lower quadrants near the midline, apparently arising out of the pelvis. During urination the stream was weak but could be stopped on command. It

stopped three times, however, of its own accord during the one act of micturition observed. Rectal examination revealed a large pelvic tumor, firm but not hard enough to be bony. It seemed to originate on the left pelvic brim and extended across the posterior wall of the bladder. A proctoscope passed well above the tumor, examination showed a normal mucosa, but a collapsed lumen due to extrinsic pressure. A stool examination was negative. Cystoscopic examination was negative.

The temperature was 98.6°F, the pulse 90, and the respirations 18.

The urine examination showed only an occasional white cell and a small number of bacteria. A urine culture gave no growth. The red-cell count of the blood was 3,870,000 with 75 per cent hemoglobin, and the white-cell count 17,600. A lumbar puncture showed normal dynamics. There were no cells in the spinal fluid, but the protein was 45 mg per 100 cc. A spinal-fluid Wassermann test was negative. Two Frei tests were negative.

X-ray films showed transverse rather cylindrical areas of calcification at the superior margin of the urinary bladder, in the region of the seminal vesicles. Above these areas there was a round, smooth mass about 6 cm in diameter. There was no abnormality of the sacrum or lumbar spine. A barium enema showed the rectum displaced to the right and forward by the soft-tissue mass. The pressure defect in the rectum was smooth, with no evidence of involvement of the bowel.

On the ninth hospital day an operation was performed.

## DIFFERENTIAL DIAGNOSIS

DR REGINALD H. SMITHWICK: A great deal of this history has to do with urinary tract symptoms. So far as I can see, the symptoms referable to the gastrointestinal tract are probably not of diagnostic significance. It is quite possible that the urinary symptoms have nothing to do with the diagnosis, but it might be interesting to try to follow them through to see if it is possible to come to a conclusion as to the nature and location of this tumor from that point of view. Before proceeding too far in that direction it might be well to see what the x-ray films show. Perhaps they are perfectly characteristic of the type of tumor this patient had.

DR AUBREY O. HAMPTON: They are not characteristic of anything I know about. I cannot add to the record, but I can point out the lesion. The mass is not so obvious on the film as you would expect it to be from the physical examination. I cannot see how it could arise from the brim of the pelvis, but since I cannot visualize the mass plainly, I must not argue too much about that.

mechanisms and much insight was gained as to child life. To this has recently been added the vast amount of material obtained by sociological investigations. It has been demonstrated that children growing up in certain neighborhoods or in certain types of homes are subjected to stresses not experienced by those in more favorable circumstances. The statistical method has been widely used, many new things have been learned, and many old errors have been corrected.<sup>11 12</sup> From many medical clinics have come studies indicating the relation between adverse social situations and the development of the neuroses.<sup>13</sup> Comparative studies of medical and social histories seem to show causal relation between situations and morbid emotional responses.<sup>14 15</sup> In one study, schizophrenia has been shown to be common in areas where other evidences of social maladjustment were most frequent, and the possibility of this disease's being precipitated or even caused by adverse social conditions is postulated.<sup>16 17</sup>

There have been two attitudes toward psychiatry in the past, one group has regarded it as a branch of medicine and has considered it solely from this light, while other groups have considered it as a way of life and have sought to leaven whole fields of human activity with certain points of view. The latter workers have continued to make progress in the fields of religion, education and law. Though some resistance has been made, in general it can be said that psychiatry has been well received by leaders in these various departments of human endeavor. We find an extension in the application of psychiatric principles to the field of

criminology.<sup>18</sup> Certainly the schoolteacher's attitude toward his work and especially his insight as to the mental life of his wards have been favorably influenced by psychiatry.<sup>19</sup> And finally, religious workers in dealing with the emotional life of individuals and their problems have learned much from the efforts of psychiatrists and psychologists.

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#### DIFFERENTIAL DIAGNOSIS

DR. REGINALD H. SMITHWICK. A great deal of this history has to do with urinary tract symptoms. So far as I can see, the symptoms referable to the gastrointestinal tract are probably not of diagnostic significance. It is quite possible that the urinary symptoms have nothing to do with the diagnosis, but it might be interesting to try to follow them through to see if it is possible to come to a conclusion as to the nature and location of this tumor from that point of view. Before proceeding too far in that direction it might be well to see what the x-ray films show. Perhaps they are perfectly characteristic of the type of tumor this patient had.

DR. AUBREY O. HAMPTON. They are not characteristic of anything I know about. I cannot add to the record, but I can point out the lesion. The mass is not so obvious on the film as you would expect it to be from the physical examination. I cannot see how it could arise from the brim of the pelvis, but since I cannot visualize the mass plainly, I must not argue too much about that.

point To me it looks as though it were free of the pelvic brim and in the middle, but at the time of the barium-enema examination, the defect is larger than the visible soft-tissue shadow so we must see only part of it This calcification interests me more than does anything else I do not remember ever having seen a blood vessel in such a horizontal position in the pelvis, and yet it looks like a blood vessel that is completely calcified I have tried to place it in the seminal vesicles, but it is not the shape of a seminal vesicle From what we can see of the mass I should say it was more kidney-shaped than round

DR SMITHWICK Do you think it is in the midline?

DR HAMPTON It does not deform the bladder so much as it does the rectum

DR SMITHWICK Apparently this is not a very large tumor

DR HAMPTON It is situated in the hollow of the sacrum We might say that it is more or less in the midline There is a peculiar area of calcification near it

DR SMITHWICK Unless this patient has some totally dissociated lesion, presumably of the central nervous system, to give him all his urinary symptoms, it is difficult to explain them on the basis of a tumor of this size, although the location of the tumor is such that it conceivably might interfere with the nerve supply to the bladder We see many tumors in the pelvis, of course, of various sizes, and they rarely cause any such urinary symptoms as these unless they are so large that they produce some mechanical difficulty in emptying the bladder Nothing is said about reflex or sensory disturbances of the extremities, and his lumbar-puncture findings I should say are within normal limits So I think it is fair to rule out a central-nervous-system lesion which might contribute to this picture

How significant this question of impotence is, I have no idea We know that the genitourinary organs have a very complicated nerve supply, coming from three sources—sympathetic, parasympathetic and somatic We know that the parasympathetic nerves have to do with the initiation of intercourse, and that the sympathetic ones have to do with the termination of intercourse We also know that the sympathetic nerves are concerned in the filling of the bladder, and the parasympathetic ones in the emptying of the bladder He seems to have had trouble with the emptying of his bladder, and yet there is no intrinsic tumor of the genitourinary tract to explain the situation As the parasympathetic nerve supply to the bladder comes from just about where this tumor lies in the region of third and fourth sacral segments, it is conceivable that by pressure on the proper

segments a tumor of this size might cause these symptoms However, a more likely possibility is that the tumor is of neurogenic origin, such as a neurofibroma or neuroblastoma, such a tumor might adequately explain this history

His abdominal pain does not seem to be characteristic of anything, perhaps it is some sort of referred pain We know he had hemorrhoids, and I suppose a tumor which displaces the rectum forward and anteriorly might increase venous stasis sufficiently to explain the bleeding, furthermore, the bleeding seems sufficient to explain the anemia There is no evidence of infection other than the elevated white count The findings certainly do not suggest an inflammatory process or abscess of pyogenic origin or a retroperitoneal tuberculous lesion The fact that the tumor is about in the midline raises the possibility of its being a midline mixed tumor with calcification or a dermoid cyst, but it seems to me that if the history is significant and one tries to explain this unusual urinary picture and relate it to a tumor of moderate size, which the patient obviously had, perhaps the best possibility is that this patient had a retroperitoneal tumor of neurogenic origin

DR AUGUSTUS ROSE I was asked to see this patient in order to determine if his difficulties were due to disease of the nervous system There was no evidence of any neurologic change except as noted in the record The impotence was very definite, and I believed that it was associated with his poorly functioning bladder I observed the emptying of his bladder, and it was definite that he had a weak stream but could stop and start it on command The frequency was present in the daytime and seemed to be due to a subjective feeling of a full bladder There was no urgency I reasoned, more or less as Dr Smithwick has done, that it was a disturbance in the peripheral nerve supply, probably parasympathetic

#### PREOPERATIVE DIAGNOSES

Dermoid cyst in pelvis?  
Lymphoma?

#### DR. SMITHWICK'S DIAGNOSIS

Retroperitoneal tumor of neurogenic origin

#### ANATOMICAL DIAGNOSIS

Ganglioneuroma of sacral plexus

#### PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The preoperative diagnosis was a dermoid cyst I imagine they were influenced by the calcification seen in the x-ray films He was explored by Dr James E Fish, who found a large, very firm and dense tumor nearly filling the posterior and left half of the

pelvis It was very difficult to find any line of cleavage, but it was finally possible to dissect it anteriorly off the bladder and rectum but not posteriorly off the pelvic wall Ramifications of the tumor were seen to extend into the sacral foramina, and it was necessary to cut across these, thus leaving tumor behind Perhaps two thirds of the tumor was resected By that time it was quite evident that it was a neurogenic tumor The sections show a very characteristic ganglioneuroma made up of twisting bundles of nerve fibers and ganglion cells

## CASE 25172

### PRESENTATION OF CASE

A fifty-nine-year-old single nurse was admitted complaining of substernal distress of fourteen years' duration

At the age of forty-five years she contracted an undiagnosed illness characterized by fever and prostration, following this she began to notice substernal distress with exercise, at first with great exertion but later with relatively little effort During the previous few years she had had attacks which awakened her at night There were occasional attacks during the day while lying on a couch During an attack she had a sensation of tightness and squeezing beneath the sternum and according to an observer became pale and cold and had to stand to obtain relief The pain sometimes radiated around the left side of the chest to the back, but not down the arms At times there was a sensation of numbness in both arms Heat was used for relief, she had never taken nitroglycerin Between attacks there was slight palpitation and dyspnea on exertion, but there had been no edema or cough Three years before admission she was seen at another clinic where she was told that she had achlorhydria, an irritable colon and a "nervous" heart Several months of treatment with belladonna and hydrochloric acid gave no relief

Physical examination showed a well-developed, fairly well-nourished woman in no distress The fundi showed moderate arteriosclerosis and arteriovenous nicking The lungs were negative The heart did not seem to be enlarged At the cardiac apex there was a loud blowing systolic murmur, and over the sternum and aortic area a blowing systolic murmur  $A_2$  was accentuated The blood pressure was 150 systolic, 80 diastolic The remainder of the physical examination was negative

The temperature was  $98.6^{\circ}\text{F.}$ , the pulse 80, and the respirations 20

The urine examination was negative A phenolsulfonephthalein kidney-function test was normal The blood showed a red-cell count of 3,670,000

with 70 per cent hemoglobin, and a white-cell count of 7500 with 64 per cent polymorphonuclears The serum nonprotein nitrogen was 19 mg per 100 cc, the fasting cholesterol 149 mg A blood Hinton test was negative The basal metabolism rate was -15 per cent An electrocardiogram showed low  $T_1$  and  $T_2$ , inverted  $T_3$  and diphasic  $T_4$  S- $T_1$  and S- $T_2$  were sagging,  $Q_3$  prominent X-ray films of the chest were negative

On the day of entry, while the history was being taken, the patient began to complain of tightness in the chest Within four minutes the blood pressure rose to 195 systolic, 136 diastolic Three minutes later 1/100 gr of nitroglycerin was given, this relieved the pain in about five minutes, but the blood pressure remained at 190 systolic, 120 diastolic, at the end of twelve minutes The pain returned (blood pressure 190 systolic, 126 diastolic), subsided in six minutes (blood pressure 180 systolic, 100 diastolic) and returned again in ten minutes (blood pressure 192 systolic, 128 diastolic) She stated that her systolic blood pressure at rest was 120, but that any excitement raised it

Two days later, while at rest, the blood pressure ranged between 140 systolic, 98 diastolic, and 170 systolic, 122 diastolic A blood pressure cuff was placed on the left arm and inflated Within five minutes the blood pressure had risen to 190 systolic, 130 diastolic, and the patient complained of pain in the left arm

On the sixth hospital day, while at rest, the blood pressure was 150 systolic, 120 diastolic The patient was given a cigarette to smoke and within three minutes the blood pressure was 185 systolic, 130 diastolic, and the patient complained of slight substernal pain The cigarette was taken away and one nitroglycerin tablet given The blood pressure, however, remained elevated and the pain continued, becoming progressively worse Two minutes after the first tablet another nitroglycerin tablet was given, but the pain continued Five minutes after the initiation of pain a third nitroglycerin tablet was given, and within one minute the pain decreased and within four minutes had disappeared Throughout this entire period the blood pressure ranged between 180 systolic, 140 diastolic, and 190 systolic, 130 diastolic At the time the pain disappeared the blood pressure was 180 systolic, 116 diastolic.

On the nineteenth hospital day an electrocardiogram showed no changes since the previous record Nitroglycerin gave her much relief, but she continued having attacks, more at night than during the day On the afternoon of the sixtieth hospital day she developed a very severe substernal pain, which was not relieved by nitroglycerin and sodium luminal Her abdomen became somewhat distended She developed an ashen color The

pulse was good, and the blood pressure 160 systolic, 120 diastolic. There were no changes in the heart tones. One day later the white-blood cell count was 17,100. She felt much better and had obtained relief from nitroglycerin. An electrocardiogram showed normal rhythm, a rate of 80, T<sub>1</sub> diphasic and T<sub>4</sub> inverted. One day after this her blood pressure was 100 systolic, 85 diastolic. The heart sounds were of poor quality. There were a few crepitant rales at the lung bases. At 5 a. m. the next day, stertorous breathing suddenly began, and she was unable to respond, though entirely conscious. The right face, arm and leg showed flaccid paralysis. Examination of the heart showed no change. On the sixty-seventh hospital day a right hemiplegia was still present, and the patient lapsed into deep coma. She died two days later.

#### DIFFERENTIAL DIAGNOSIS

DR WILFRID COMEAU. The history as given here is almost a textbook picture of a woman who over a period of fourteen years has developed progressively increasing coronary insufficiency and finally angina pectoris decubitus. If we had more information it would be interesting to speculate as to whether the undiagnosed illness was a coronary thrombosis. It is just as likely, however, that this illness was not related to her heart but that it caused her to focus her attention on herself and she became aware of symptoms which she had not noted previously. I stated that the history was *almost* a textbook picture because there is one atypical feature, namely that the pain radiated to the back. It is very rare in angina pectoris due to coronary disease for pain to be referred to the back. In such cases one usually thinks of aortitis and, of course, in an acute episode, of a dissecting aneurysm. However, in spite of the slightly atypical nature of the pain, I do not see how one can escape from the conclusion that she was having progressive coronary insufficiency. In view of certain features of her illness which are mentioned later, there are certain points to be noted in her history: (1) during the attacks she became pale and felt cold, definite evidence of vasoconstriction, (2) there were no symptoms of hypertensive crises, and (3) no symptoms were present to suggest cardiac failure. I do not attach a great deal of significance to the palpitation and dyspnea.

I shall admit that I am a bit disturbed about the auscultatory findings. At best it is difficult, even when you are listening, to interpret murmurs such as are described here, particularly when the heart is normal in size. I should appreciate more detailed information in regard to the quality of the murmur. Instead of being two murmurs, was this one murmur which was widely transmitted

and loudest in one area? One would like to know whether a thrill was present, and in addition, since the individual was a nurse, it is quite possible that she might have known how long she had had this murmur. In any case, with the information presented here certain things definitely come to mind that might possibly explain the auscultatory findings. Aortic dilatation and tortuosity, of course, is one and is not uncommonly the cause of an aortic systolic murmur in old individuals. Ventricular dilatation can cause such murmurs as these, although again the lack of cardiac enlargement is against such an assumption. The foremost which comes to mind is aortic stenosis. That might explain the loud blowing systolic murmur heard all over the precordium and under the sternum. I do not believe I am carrying the differential diagnosis too far in suggesting a septal defect because, after all, people with septal defects do live to an old age, and on occasions such a diagnosis is missed because of the age of the patient. Then too, on rare occasions to be sure, people with coronary heart disease and coronary thrombosis do perforate their septums and survive. It might be well to look at the x-ray films and eliminate some of the possibilities which I have mentioned.

DR RICHARD SCHATZKI. The x-ray film is negative so far as the heart is concerned, it is of normal size and shape. The patient has evidence of a primary tuberculous process or Ghon's tubercle on the left side with corresponding hilar calcification and evidence of old scarring at the apices. The aorta is tortuous and elongated but not definitely dilated.

DR COMEAU. In view of the x-ray picture and the fact that the size of the heart is normal, I am satisfied to explain the murmurs on the basis of a tortuous aorta. The basal metabolic rate is at the lower limits of normal, but I do not attach much significance to this or to the other laboratory findings. The electrocardiograms show only slight changes, but nevertheless changes which are consistent with coronary heart disease. The charts show that excitement, the pain of the blood pressure cuff and tobacco caused a marked rise in both the diastolic and the systolic blood pressures, averaging about 25 mm. of mercury for the former, with a high point of 35 mm., and 40 mm. for the latter, with a high point of 50 mm. Of course the point to decide is whether these changes in blood pressure were due to organic disease. There is no indication in the history and physical examination to suggest prolonged arterial hypertension. One could suggest an adrenal chromaffin tumor, but the lack of hypertensive crises and the length and nature of her illness do not allow such a diagnosis to be entertained. The rise of

blood pressure which accompanied her angina is not unusual, and it probably occurs quite commonly. Similarly, a rise of blood pressure during coronary thrombosis, although it is classically described as falling, is not uncommon during the period of pain. When the pain is relieved or if shock develops, then the blood pressure falls. All these data on the blood pressure, I believe, merely indicate an abnormal response of the autonomic nervous system to excitement, pain and tobacco. It is true that these three factors in a normal individual may cause slight rises in diastolic and systolic pressures. In this case, if I am correct, it means she had a very unusual response to such stimuli. Certainly I have never seen a diastolic rise of 35 mm from such factors as we have mentioned. In chronic hypertension there are reports that emotion has occasionally caused an elevation of the diastolic blood pressure as high as 25 mm., but there is no evidence that this patient's blood pressure was elevated constantly to any marked extent.

It seems that the expected sequence of events occurred in this case, namely a very severe attack of substernal pain, which I interpret as an attack of coronary thrombosis. The changes in the electrocardiogram, even slight as they are, are strong confirmation that such has occurred. The fact that the blood pressure did not fall is probably due to the point which I brought up previously, since it fell later, after she had recovered from pain. Three days later she developed cerebral symptoms which I interpret as due to a cerebral embolus from a mural thrombus in the left ventricle, perhaps this is a little early for such to occur, but it is not incompatible. In summary then, my conclusion is that this individual had marked coronary heart disease with severe angina pectoris for a number of years. She had at least one coronary occlusion, which occurred a few days before her death, with the formation of a mural thrombus in the left ventricle, which, in turn, resulted in a cerebral embolus.

DR ASHTON GRAYBIEL: The only other point I might mention is that an electrocardiogram taken after slight exercise, such as walking down the hall, showed marked inversion of the T waves in Leads 1 and 2. This is the first time I have seen such marked changes in the T waves as a result of exercise.

A PHYSICIAN: Did anyone contemplate surgery for relieving this condition?

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the extent of improvement following remission of the anemia.

#### CLINICAL DIAGNOSES

Angina pectoris decubitus  
Coronary thrombosis  
Cerebral thrombosis

#### DR COMEAU'S DIAGNOSES

Coronary heart disease, with angina pectoris decubitus  
Coronary thrombosis, with mural thrombus  
Cerebral embolus

#### ANATOMICAL DIAGNOSES

Arteriosclerosis, coronary and aortic  
Coronary thrombosis, old and recent  
Myocardial infarction, recent  
Hydrothorax, bilateral  
Pulmonary atelectasis  
Healed pulmonary tuberculosis  
Chronic cholecystitis  
Cholelithiasis

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DR TRACY B MALLORY: The postmortem showed very severe coronary changes. The right coronary artery was completely blocked with an old calcified mass that had evidently been present for years. The left coronary and each of its two main branches were markedly narrowed by old sclerotic plaques, and there was a quite fresh thrombus in the left descending branch. Corresponding to that was a small area of fresh infarction at the apex, about 2.5 cm in diameter. We did not find evidence of any old infarction. There was no ventricular thrombosis overlying the infarct, and although we did not have permission to examine the head, I am tempted to believe the cerebral lesion was a local thrombosis rather than embolism, because shortly after the cardiac infarction occurred the blood pressure dropped and for a considerable period the pulse pressure was not over 20 mm., all of which would favor thrombosis.

DR PAUL D WHITE: Was the aortic valve all right?

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## PNEUMONIA PROPHYLAXIS

FROM the point of view of both mortality and disability, pneumonia is now recognized as the most important acute infectious disease. It is for that reason that, following the pandemic of influenza in 1918, the Metropolitan Life Insurance Company became interested in furthering research in the control of this disease. Ostensibly set up for the purpose of promoting studies of influenza, the Influenza Commission of the Metropolitan Life Insurance Company, headed by Dr. Milton J. Rosenau, soon saw the wisdom of extending its support to pneumonia investigation. The most important studies carried out under grants from this commission were those conducted at the Harvard Medical School by Dr. Lloyd D. Felton, who succeeded in making the specific serum ther-

apy of pneumonia feasible, safe and effective. The results of his laborious studies in this field have been applied with various modifications to the concentration and purification of antipneumococcus horse and rabbit serums of various types and these, in turn, have become effective weapons in controlling the death rate from the pneumococcal pneumonias.

In addition to the great importance of this disease in the general population, it is now becoming increasingly apparent that, under the proper conditions, the pneumococcal pneumonias may take on epidemic proportions. This epidemic character was first recognized in the United States Army camps during the World War. Greater impetus has been given to the epidemiological studies on pneumonia by the widespread use of pneumococcus typing facilities, particularly following the classification of the pneumococci which did away with the former miscellaneous Group 4 and substituted in its place specific Types 4 to 32. Epidemics have been recognized in families, in children's homes, in hotels for transients, in state institutions for mental disease, in institutions for disabled veterans, in CCC camps, and in small communities. The very great prevalence of pneumonia in certain localities, notably Pittsburgh and the mining regions of British South Africa, is almost in the nature of recurrent epidemics.

The use of vaccines for the prevention of pneumonia had its first extensive trials under Lord Lister in the South African mining camps and also had some trials in our army camps during the World War. Whole bacterial vaccines were used. The immunological evidence at that time and, indeed, since then, has indicated the strictly type-specific character of the antibody response to such vaccines. The extensive studies of Lister, with the more recent collaboration of Ordman, have indicated that if the types of pneumococci prevalent in the pneumonia of a given locality are included in a vaccine, the persons inoculated with such vaccines are protected against pneumonia due to these types. But other types of pneumococci soon appear and pneumonia recurs.

Felton's more recent studies have been con-

cerned with the difficult problem of isolating immunizing antigens which are free from untoward reactions and have a wide antigenic activity. These studies, begun at the Harvard Medical School and continued at Johns Hopkins University School of Medicine and now at the National Institute of Health, are gradually bearing fruit. In his most recent report Felton<sup>1</sup> summarizes the chemical and immunological characteristics of fractions of pneumococci which are antigenic for both mice and human beings. He also presents a method of testing for the presence of substances responsible for untoward reactions when injected into human beings, as well as methods of treating the antigens so as to eliminate these untoward reactions.

Felton has succeeded in preparing a Type 1 antigen which was type-specific in white mice but which, when injected in children, produced antibodies against Type 2 in as high a titer as against Type 1. Conversely a specific Type 2 antigen stimulated Type 1 antibodies only rarely in children. In adults, however, both these antigens stimulated heterologous immunity.

An antigen prepared by Felton's method has been used recently in Massachusetts to control an institutional outbreak of Type 1 pneumonia, with apparent success.<sup>2</sup> A much wider study of the prophylactic value of this antigen has been undertaken in the CCC camps under Col. Ekwurzel and Lt. Col. Simmons of the Medical Corps of the United States Army. A careful statistical analysis<sup>3</sup> of their results has been recently presented. To quote

In the New England camps the pneumonia incidence rate was 4.34 cases per 1000 years of life in the inoculated group as compared with 7.28 per 1000 years of life in the control group. The corresponding figures for the West Coast camps are 1.73 and 15.69 per 1000 years of life, respectively. Thus the findings of the 1936-37 experiments are consistent with the impressions gained from the other preliminary experiments. Taking all the experiments together, it appears that this or a similar antigen may prove to be a useful tool for the control of pneumonia incidence.

There is some indication that the antigen may be most effective for adolescents and that it loses its effectiveness with advancing age. It was found in the New England camps that, at ages under twenty, the pneumonia incidence rate in the control group was

27 times that in the inoculated group, at ages twenty to twenty four, the ratio was 1.4, and at ages twenty five to forty nine, the inoculated enrollees actually experienced a higher rate than the control group.

There was no satisfactory evidence found to show that the antigen will lower the incidence of respiratory conditions other than pneumonia. Enrollees in the inoculated group in the New England Civilian Conservation Corps camps lost from duty an average of 4.22 days per 1000 days exposed to risk of infection, while the corresponding figure for the group not inoculated was 4.38 days per 1000 exposed.

These results are encouraging, and the studies are being continued in the CCC camps and in the regular army.

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#### MATRIMONIAL MONTHS OF THE NATIONS

THE Metropolitan Life Insurance Company, for reasons not divulged but possibly actuarial, possibly to lend color to one of its recent statistical bulletins, has studied the marriage months of choice of various countries situated in various climes.

Apparently the proverbial June bride is not proverbial everywhere. Even in the United States the month of June with 13 per cent of the marriages leads September, the second choice, by only 2 per cent. Canada closely approximates our figures. Down under, in Australia and New Zealand, the British territories of the southern hemisphere, the corresponding month of December leads with brides and roses, with the fall month of April a close second choice.

In other countries the seasons when holy wedlock occupies the minds of proletariat and gentry alike are determined by a variety of conditions, among them climate, religion, superstition, racial customs, degree of urbanization, economic status and occupation. Peoples that are primarily agricultural apparently prefer the fall when harvests have been gathered, profits, if any, pocketed and leisure

# The New England Journal of Medicine

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## PNEUMONIA PROPHYLAXIS

FROM the point of view of both mortality and disability, pneumonia is now recognized as the most important acute infectious disease. It is for that reason that, following the pandemic of influenza in 1918, the Metropolitan Life Insurance Company became interested in furthering research in the control of this disease. Ostensibly set up for the purpose of promoting studies of influenza, the Influenza Commission of the Metropolitan Life Insurance Company, headed by Dr. Milton J. Rosenau, soon saw the wisdom of extending its support to pneumonia investigation. The most important studies carried out under grants from this commission were those conducted at the Harvard Medical School by Dr. Lloyd D. Felton, who succeeded in making the specific serum ther-

apy of pneumonia feasible, safe and effective. The results of his laborious studies in this field have been applied with various modifications to the concentration and purification of antipneumococcus horse and rabbit serums of various types and these, in turn, have become effective weapons in controlling the death rate from the pneumococcal pneumonias.

In addition to the great importance of this disease in the general population, it is now becoming increasingly apparent that, under the proper conditions, the pneumococcal pneumonias may take on epidemic proportions. This epidemic character was first recognized in the United States Army camps during the World War. Greater impetus has been given to the epidemiological studies on pneumonia by the widespread use of pneumococcus typing facilities, particularly following the classification of the pneumococci which did away with the former miscellaneous Group 4 and substituted in its place specific Types 4 to 32. Epidemics have been recognized in families, in children's homes, in hotels for transients, in state institutions for mental disease, in institutions for disabled veterans, in CCC camps, and in small communities. The very great prevalence of pneumonia in certain localities, notably Pittsburgh and the mining regions of British South Africa, is almost in the nature of recurrent epidemics.

The use of vaccines for the prevention of pneumonia had its first extensive trials under Lord Lister in the South African mining camps and also had some trials in our army camps during the World War. Whole bacterial vaccines were used. The immunological evidence at that time and, indeed, since then, has indicated the strictly type-specific character of the antibody response to such vaccines. The extensive studies of Lister, with the more recent collaboration of Ordman, have indicated that if the types of pneumococci prevalent in the pneumonia of a given locality are included in a vaccine, the persons inoculated with such vaccines are protected against pneumonia due to these types. But other types of pneumococci soon appear and pneumonia recurs.

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#### THE CHILD AND HIS ENVIRONMENT\*

Some of you—perhaps many of you—have read A. A. Milne's whimsical little book, *Winnie-the Pooh* and will smile at the recollection of the old grey donkey, Eeyore. Eeyore always had a chip on his shoulder He was always being slighted, at least in his own mind, and he was always grumbling, despite the fact that the other creatures of the wood really went out of their way to be kind to him. Eeyore's reply to a morning greeting is typical

Good morning, said Eeyore. 'If it is a good morning, he said 'Which I doubt,' said he 'Not that it matters, he said'

Eeyore, melancholy old donkey that he was, was sadly out of tune with his environment. He was maladjusted, to use a modern but expressive term. Something must have happened to him in some forgotten corner of his childhood that prevented him from getting along with people as he grew older. Some disappointment had come to him, or some fear had been planted in his mind, or some injustice had built up in him a resentment toward his fellow beings. Perhaps he was shy and sensitive and protected himself from further wounding by a gruff exterior. Perhaps he was a round peg in a square hole, or a square peg trying to accommodate itself to a round hole. Whatever the reason, his personality did not click and he did not have fun like other donkeys, and the pigs and tigers and kangaroos and teddy bears in the book that might have been his friends

The environment, according to Webster's dictionary, consists of the surrounding conditions, influences or forces that bear on us. When applied to the individual child, this means the small world in which he lives and moves,

and the people in it with whom he must come in contact—in the home and in the school, at work and at play. A happy adjustment exists when the environment, by its nature or by the changes that we are able to make in it, suits the individual, and when the individual, by nature or by the changes that can be made in him, suits his environment.

We must assume, at the start, that all holes are not round, convenient as it would be to have them so, and that pegs come in many odd and uncomfortable shapes. Sometimes we can shape the hole of environment a little or a good deal, depending on circumstances, more often our task is to try and shape the child peg to fit as comfortably as possible into the world that the centuries formed for him.

During the months of the child's infancy, our opportunity to improve his environment is the greatest. We can furnish suitable food for him, we can give him a place to rest and the opportunity to use it, we can modify his formula to meet his needs, we can give him sunlight, cod liver oil and orange juice, we can see that he is not too cold and not too warm, we can keep uncomfortable friends and relatives from him. We can see to it that he has the advantages of comfortable clothes and bedding, and proper soaps and powders and washcloths and towels. In these ways we can alter and improve both his physical and his mental environments.

As he grows older, as he grows farther away from the close, protective environment that we had hitherto been able to furnish for him, our task becomes harder. He is outgrowing us, and one of our greatest mistakes lies frequently in trying to prevent this outgrowing process. When our child was a baby, each detail of his life needed superintendence for his own good. As he matures, we must take care that we do not tie him to our apron strings, that we do not try to keep him in the hothouse environment that his infancy seemed to require.

Less and less, now, can we adapt the environment to the child. We can still see that he has proper clothing and suitable shoes, that his room is occasionally aired and properly warmed, that he has a comfortable bed and a reasonable diet and the correct vitamins, both in number and amount. We can try and furnish him with the right type of play materials, and proper companions, and eventually, so far as it is in our power to select it, the right school. In these ways we can still fit the environment to the child. Most of all, by our own attitudes and our own composure and self-control, we can furnish a pattern of behavior that may eventually be adopted, for the child is by instinct imitative. Let us give him something worthwhile to imitate, then, not a pattern of behavior of which we are ourselves ashamed, when we stop to think it over.

In these ways we can continue to adapt the environment to the child. We must, however, in increasing measure, recognize the truth that our children will be forced to meet and live in a world that has already hardened into its age-old lines of conduct. It is a world of competition, of selfishness and of greed, yet with its occasional kindly aspects cropping up here and there. This we cannot change, and our duty from the beginning is so to prepare the children of the world that they can adapt themselves to its many-sided influences. This is the permanent environment to which they must adjust their lives in order to live happily and competently.

Adapting the child to the environment is a process that begins with his birth. It might almost be said to begin before his birth, since the care that is given to the mother has its effect also on the physical well-being of

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Piscatorial countries such as Norway and Scotland turn marriage-minded in December after the return of the fishing fleets from their cruises of the previous spring and summer. Religion and creed are important factors in determining the seasonal incidence of weddings, for in periods of religious fasting and penitence few marriages are solemnized. Periods of religious festivity, on the other hand, are particularly suitable for wedding seasons. Thus, during the Lenten season in Catholic countries, and during the Passover period among the Jews, few marriages are celebrated. In Greek Orthodox countries, such as Bulgaria and Roumania, February, the month before Lent, is the popular marriage month, in Roman Catholic countries the preference is to postpone the wedding ceremony until after the Lenten season. Among both Roman and Greek Catholics the Christmas holiday season is considered a propitious time for joining in wedlock. Among the Swiss and the Germans, May, the spring festival month, is favored for embarking upon the sea of matrimony.

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perium will be taken up, but before publishing these cases it seems worthwhile to review the cases of postpartum hemorrhage.

We have found no cases of postpartum hemorrhage associated with hydramnios or with twins per se. There have been no cases reported in which hemorrhage was of sufficient importance to be classified as a complication in connection with vestibular or perineal lacerations. This does not mean that postpartum hemorrhage is never associated with these conditions, but it does suggest that these conditions are negligible as common etiologic factors.

Of the total number of cases reported there was only 1 in which an adherent, partially separated placenta played a large part in the accompanying hemorrhage. Nevertheless we believe that such placentas must still be classified as among the frequent etiologic factors.

Deep cervical lacerations have been shown to be common causes of postpartum hemorrhage, and it must be borne in mind that such lacerations may rarely occur in normal labors. The frequency of postpartum hemorrhage associated with torn cervixes as a result of accouchement forcé has been brought out. We hope that the operation has been so condemned that, in the future, postpartum hemorrhage from this source alone will occupy the negligible place that it deserves, the operation, itself the cause of the condition, is never indicated.

The purely atonic uterus, which may follow any labor, is still the commonest cause of postpartum hemorrhage. The cases reported illustrate the possibility of this condition associated with labors that are abnormal in no degree.

How best should they be treated? To be prepared adequately to meet this emergency, all patients should be hospitalized. In no other way can severe postpartum hemorrhage be treated perfectly. There is still some difference of opinion as to the need of carefully watching the fundus after the birth of the baby, it seems, however, that in no other way can one be sure that the uterus is not relaxing and filling with blood.

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argument. If their companions are planning something that even seems unwise, then let ours do it also, if it is not too bad, for they must not be made too different from their fellows. We must play to them the part that knowledge played in the old interlude, when he said

Everyman, I will go with thee, and be thy guide,  
In thy most need to go by thy side.

## DEATHS

**MURPHY**—EDWARD V. MURPHY, M.D., of Newport, Rhode Island, died March 9. He was in his seventieth year.

Dr. Murphy received his degree from the College of Physicians and Surgeons of Baltimore, in 1899. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

**PECK**—ROY H. PECK, M.D., of 15 Temple Street, Springfield, died March 29. He was in his sixtieth year. Born in Burlington, Vermont, he received his early education there. After his graduation from the University of Vermont he attended the Baltimore Medical College and received his degree from the Kentucky School of Medicine in 1903. He took a postgraduate course at Johns Hopkins University and then studied in New York and abroad.

Dr. Peck was a fellow of the Massachusetts Medical Society and the American Medical Society, and was a member of the American Urological Association.

His widow, his mother and a cousin, survive him.

## MISCELLANY

### GOVERNMENTAL AID IN CANCER CONTROL

Patients with advanced cancer who have been treated at the University of California with rays from the cyclotron, the new atom smashing machine, are furnishing much encouragement for scientists in this field, officials of the National Cancer Institute of the United States Public Health Service recently announced.

"Tests have not gone far enough to establish permanent cures," Dr. Ludvig Hektoen, executive director of the National Advisory Health Council pointed out, but the cancerous growths of these patients are receding, and this bit of encouraging evidence of the value of the radio-active particles produced by the cyclotron is leading to further studies and experimentation.

The National Advisory Cancer Council at a recent meeting recommended to the Surgeon General of the Public Health Service that \$23,000 be given to the University of California to help finance special cancer treatment work to be undertaken in connection with a new medical cyclotron. It is expected that the new instrument will be installed at Berkeley, California, next month.

This grant makes a total of nineteen grants aggregating \$159,000 which have been recommended by the council since the National Cancer Institute was created by a Congressional Act of 1937.

Other current activities of the Institute include (1) twenty-two young physicians receiving special training in diagnosis and treatment at approved cancer clinic centers; (2) a cancer unit being developed at the United States Marine Hospital in Baltimore to provide additional facilities for an estimated 4000 cases in the next twenty-five years; (3) the granting of fifteen research fellowships for work on projects undertaken by the National Cancer Institute and private research centers; (4) five field invest-

gations now under way on the incidence of cancer, its mortality, the epidemiology of the disease with special reference to the deadly lung cancer, the effectiveness of various methods of therapy and the cost of adequate therapy; and (5) purchase of 9.5 gm. of radium, delivered to the Bureau of Standards for rigid tests before the supply is distributed to hospitals and clinics throughout the country (only 10 gm. will be retained for the Institute's own work).

During this month staff members of the Institute are co-operating in the nationwide observance of Cancer Control Month, the month of April being set aside each year by congressional resolution and by a presidential proclamation as the time when special attention is given to educational efforts in behalf of the control of cancer, the disease which ranks second in the causes of death in this country and which in recent years has become increasingly serious as a public health problem. *Release (No. 17-6) from the United States Public Health Service dated April 14, 1939.*

### YOUR HEALTH BROADCASTS

The next series of 'Your Health' broadcasts, sponsored by the American Medical Association and the National Broadcasting Company and heard over the Blue Network each Wednesday at 2:00 p. m., is entitled Mothers and Children. It consists of four broadcasts as follows:

#### May 3 Healthier Babies

Daily routine of the healthy baby, medical supervision, feeding

#### May 10 Healthier Mothers.

General advice for the expectant mother, good for girls and boys to know about.

#### May 17 The Doctor's Workshop

The place of the hospital in the health program of individual and community

#### May 24 Toddlers, 1939

The preschool child and the health and personality problems of that age.

### NEW ENGLAND WINNERS IN HEALTH CONSERVATION CONTESTS

The awards for 1938 in the City Health Conservation Contest and the Rural Health Conservation Contest were recently announced by the Chamber of Commerce of the United States and the American Public Health Association. These contests are said to be the most effective means of stimulating adequate health protection and health promotion services yet devised in this country. The awards are made according to the effectiveness with which a community has met its health problems.

In the City Health Conservation Contest the winner in Group II (population 250,000 to 500,000) was Providence, Rhode Island and in Group IV (population 50,000 to 100,000) Newton, Massachusetts. In Group V (population 20,000 to 50,000), Stamford, Connecticut, received an award of merit. Furthermore, Brookline, Massachusetts, and Greenwich, Hartford and New Haven, Connecticut, each received a special award in recognition of the maintenance of previously high standards that were the basis of two or more previous first awards in its respective population group.

In the Rural Health Conservation Contest, awards of merit were given to Barnstable and Berkshire counties, Massachusetts, and in the contest for tuberculosis control Newton, Massachusetts, and Hartford, Connecticut, were tied for first place, with an award of merit going to New Haven, Connecticut.

the child There is a fortunate tendency today to draw away again from the overstrict training of the baby, that begins almost from the day he is born We feel now that it is not necessary or even wise, in many cases, to stick too strictly to a regular feeding schedule with a set number of hours between feedings and a set number of feedings a day

Dr Arnold Gesell, who has contributed so much to the study of infants behavior in his New Haven clinic, has taught us that the timepiece of a baby's own nervous system and stomach is more valuable to the baby's individual needs than are all the most accurate timepieces in the world When the baby's stomach begins to contract with hunger pains, he knows that it is time to be fed whether the clock hands stand at eight or ten o'clock, or even if it is at two o'clock in the morning and that particular hour for feeding has been forbidden

Our tendency has been to start training habits at too early an age, and to pursue them too relentlessly—in insisting on an inflexible adherence to rigid hours of feeding, trying even to insist that an infant must take care of a planned amount of nourishment in a given amount of food, carefully divided into a fixed number of feedings, each of which must be entirely consumed at a stated hour! Bowel training, according to the formula for producing standardized children, must be begun at so many weeks of age and accomplished at so many months, and thereafter there must be no lapses Bed wetting is forbidden, according to this formula, after the age of two years, and thumbsucking is banned at any age

Many babies, of course,—perhaps the majority of babies,—will thrive on this regimentation, but Dr Gesell feels that there are other things we can do for them that are more important than a rapid adjustment to a feeding schedule which has been worked out beforehand, a precocious use of the chamber vessel, or an enforced stopping of the sucking reflex. More important, according to this authority, is the development of a sense of security that comes to the infant from being fed when he is hungry, and from being left alone when he is sleepy Schedule-fixing creates tensions and conflicts that are of considerable importance at this age, and even the best schedule that can be devised for the individual represents a compromise between his make up and the needs of the particular environment into which he is born

The fundamental principle that I should like to emphasize this afternoon is that each infant—each child—is an individual, reacting differently from others to the same kind of thing, and the greatest help we can give him in the adjustment to his environment—the living world about him—is a sense of physical and mental security

I have tried to show that, while the infant can carefully and gently be molded to his environment, it is during the years of infancy and early childhood that the most can be done with the environment itself Of course, our effectiveness with both the child and his surroundings in our attempts to accommodate the one to the other grows steadily less as the years advance. Our protectiveness cannot continue too long, nor is it wise that it should We have a little longer time to work with the plastic human material than we have with his rapidly expanding world, but even that time is all too short, and we must use it to the best advantage.

We know at best little about the future surroundings in which our child will find himself Little did our own parents know of the stresses and tensions, the violence and letting loose of the world's passions that were so close at hand when we were born, little did they know of the economic and social changes that were to come and

to which their children would have to adjust themselves. Little do we know of the conditions that our children will have to meet when they leave what protection we have to offer What we do know—a knowledge that was hardly appreciated a generation ago—is that times are constantly changing and that new and strange conditions are always ahead

For these changes and for an independent and self-reliant life, the child must be prepared, so far as it is in our power to do so, with thoughtfulness and wisdom and with patience, but with firmness. Dr Gesell summed up this duty of ours when he wrote "The key to the mental hygiene of childhood lies in building up adequate self-reliance and independence. Even in infancy this principle must be regarded. Not only from the breast must the child be weaned. Slowly but progressively he must attain befitting fortitude and detachment. He cannot always play in his mother's lap, he must in time begin to play on the floor, he cannot always play in the same room with his mother, he must learn to play in an adjoining one—first, for a few minutes, later, for an hour at a time. If the mother must leave the house to hang up the clothes, he must be content to watch her through the window—even though it costs him a struggle. He must even learn to go to bed alone, and later to school alone. Gradually then the shift comes, from adaptation of the environment, even as we train the infant, to intensive training of the child, as the horizon of his environment broadens to such a degree that we cannot do much about it, except occasionally in certain narrow ways

Here are the things that we must try and do with these children before they finally slip beyond our immediate influence—and if we are successful, our influence will guide them through their lives. We must try by precept and example, and more by the lives we lead ourselves than by any lectures we are capable of giving, to teach to them nervous and emotional stability and calmness of mind under adverse circumstances. If they are masters of themselves, they cannot be mastered in mind or spirit by their surroundings. If they have inner resources, they cannot become prey to the doubts and fears and indecisions that will beset them, nor can they fall heir to the boredom of not knowing what to do when the art and literature of the ages and the mysteries of science and the wonders of nature are constantly beckoning about them

We must try ourselves, as hard as we possibly can, to be the kind of persons we want our children to be. Without self-control we cannot teach self-control—without peace of mind we cannot show them the value of calmness and fortitude. You cannot shout at a child to make him quiet and have your words effective.

We must cut to a proper level the amount of outside stimulation that our children are to receive, and try to make sure that it is of a suitable type. The shaping of some of these influences in developing the character of our future American men and women presents a direct challenge to the motion picture and radio industries. We must find out and provide the best play materials for developing ingenuity and inner resourcefulness, we must at least expose our children to the best music, and do it seriously, in the hope that that particular contagion will take, we must see that they have available the best books and best magazines, and encourage their use in order that reading for pleasure must not become a lost art, we must allow their personalities to develop, even if this development at times seems unsound to us. If we must argue with our children, let them at times win the

Treatment by bouginage was carried out at various times, but with only temporary improvement. After the first attempt at dilatation the patient complained of substernal pain, but showed a normal temperature, pulse, respiration and blood count. After bougies and esophagoscopes had been passed several times, the Tucker dilator was resorted to. A pressure of 5 pounds was used the first time. The patient did well, gaining 20 pounds during the following two months. During this period an afebrile inflammation of the upper lobe of the left lung appeared, but cleared up by spontaneous absorption. Before discharging the patient, the Tucker dilator was used once more, this time at a pressure of  $8\frac{1}{2}$  pounds. On the same evening the substernal pain reappeared. Within thirty six hours the temperature rose to  $103^{\circ}\text{F}$ , and the white blood-cell count to 10,200, later to 18,000. On the fourth postoperative day the roentgenologist reported a shadow suggestive of a subdiaphragmatic abscess, and an abscess of the lesser omental cavity was evacuated. Two days after this the patient died of peritonitis. Autopsy revealed a perforation on the posterior wall of the stomach, about 5 cm. below the cardiac orifice. Another small area was nearly perforated. A diagnosis was made of spontaneous rupture of the stomach due to a weakening of the stomach wall by a previously existing pathologic condition. The author believes that the latter contributed to the development of the cardiospasm.

*Discussion* Dr Mosher stated that 8 pounds was too much pressure to use and that he had found that strictures do not require such high pressure.

**POSTOPERATIVE TONSILLAR HEMORRHAGE.** Dr John R. Noyes, Brockton, Massachusetts.

After reviewing the various hemostatic procedures of the past and present, the author described a method that has yielded excellent results in 126 cases during the past eighteen years. After cleaning out the tonsillar fossa and locating the bleeding point, 0.5 cc. of a 10 per cent novocain solution, containing 1 minim of adrenalin in each cubic centimeter, is injected around it. If the bleeding point cannot be found it is best to inject various areas. Up to 10 cc. of the solution can safely be used. The author believes that the mechanism of the hemostasis under this treatment is the pressure exerted by the injected fluid plus the vasoconstrictor action of the adrenalin.

*Discussion* Dr George L. Tobey cited a case of bleeding into the tissues of the soft palate. All procedures to stop the hemorrhage had failed. At the time of this discussion he was considering the possibility of having to tie the external carotid artery. Dr August L. Beck stated that he prefers to place his trust in the bipolar diathermy apparatus. Dr Lyman G. Richards lamented the fact that so little is known about the cause of postoperative bleeding from the tonsillar fossa. He had found the determination of the bleeding and clotting times were of no help and stated that primary hemorrhage can be the fault of the operator, secondary bleeding not.

**PRECAUTIONARY MEASURES IN PARANASAL SURGERY UNDER LOCAL ANESTHESIA.** Dr William H. Chaffers, Lewiston, Maine.

The author cited the case of a young physician who was twice treated for an obscure, painful eye condition. Routine examination revealed a sessile tumor on the border and lateral surface of the right inferior turbinate. This proved to be a calcium-encrusted cotton tampon. Finally it was learned that nine years previously the patient had been operated on for a dentigerous cyst of the maxilla and

that cotton tampons had been placed into the nostril of that side. One of these had been overlooked and it remained in the nose, giving rise to coryza like symptoms and slight respiratory obstruction. Some years previously the author, while doing a secondary Caldwell-Luc operation, removed a cotton tampon from the antrum. This tampon probably necessitated the secondary operation by interfering with healing.

The author stressed the importance of thoroughness in history taking regardless of whether the patient be layman or physician. He also said that he considers it advisable to institute tampon counts, just as the general surgeon insists on sponge counts.

**APPLIED BIOCHEMISTRY IN THE ETIOLOGY AND TREATMENT OF CLINICAL CONDITIONS OF THE NASAL ACCESSORY SINUSES.** Dr DeForest C. Jarvis, Barre, Vermont.

The author stated that he believes that in many cases certain foodstuffs can give rise to nose and throat conditions with which every nose and throat specialist is confronted daily: excessive watery or mucopurulent nasal secretion, enlarged turbinates and a pharynx with large lateral bands and lymph follicles. These conditions are, in the author's opinion, due to what he terms 'a block in the body process of cell oxidation.' The offending foodstuffs the author has found to be wheat, graham and buckwheat flour, white and brown sugar, and citric acid as found in citrus fruits. For these rye flour, oatmeal, cornmeal, honey, bananas and apple juice are substituted. For the most efficient utilization of these foodstuffs in the body cells it is necessary to supply oxidizing minerals such as iodine, iron, copper, manganese and arsenic, all in organic form. The mineral content of the blood determines the rate at which the blood sugar is burned. In the author's opinion the American diet is very low in mineral ash. The treatment of such conditions brought about by a 'block in the body process of cell oxidation' is directed, first, to the establishment of a proper diet and, second, to the administration of an oxidizing catalyst in the form of insulin. Of this latter the patient is given 3-unit doses subcutaneously whenever he presents himself for examination. In addition the patient is instructed to take 3 drops of Amend's iodine solution twenty minutes before meals. Under this form of treatment, cases of acute sinusitis usually clear up in three days, subacute cases require ten days, and chronic cases six to twelve months. The author cited 2 typical cases which responded promptly under the treatment described.

**HEARING AIDS BY A WEARER OF ONE.** Miss Elsie L. Staples, Boston.

The speaker discussed the use of hearing aids from the standpoint of the wearer. She strongly advised that hearing aids be resorted to before the deafness had progressed too far. Most persons receive but little help from a hearing aid until the hearing loss amounts to from 30 to 35 per cent, but when that point has been reached no further delay should be tolerated. No otologist should allow his deaf patients to struggle along until they have stopped trying to hear. At this point the speaker related how not one of the otologists whom she had consulted for the possible treatment of her deafness had called her attention to the use of lip reading or a hearing aid. It was her oculist who did that. The somewhat complex psychology of the deaf was discussed in some detail. Thus it makes a great deal of difference whether or not a deaf person hesitates to ask for the repetition of sentences or phrases. Some want to carry on their wonted activities, others resign themselves

## MIDDLESEX UNIVERSITY

Dr Stephen Rushmore, chairman of the Approving Authority on Medical Education, Dr DOMIZIO A. Costa, member of the Board of Registration in Medicine, and Dr William H. Blanchard, surgeon-in-chief of the Captain John Adams Hospital, were the principal speakers at the annual banquet and ball of Middlesex University on April 13 at the Hotel Statler. Dr Rushmore complimented the trustees of Middlesex University on the prompt acceptance of the suggestion of the Approving Authority that the requirements for admission to the junior-college premedical course be raised so as to exclude high school graduates with less than a B average in college preparatory courses. In conclusion he said "It is my wish for your institution and for yourselves that you may strive worthily and justly and that you may receive the just reward of your striving." Dr Costa spoke on the history and functions of the Board of Registration, and Dr Blanchard discussed the position of the physician and of medical schools in the economic world of today.

Guests at the head table included the following physicians: Dr Alonzo Shadman, superintendent of the Forest Hills Hospital, Dr Edward J. Dailey, superintendent of the Central Hospital in Somerville, Dr Martin L. MacDonald, president of the Alumni Association of Middlesex University, and Dr Horatio S. Card, secretary, and Dr Frank L. Whipple, vice president, of the trustees.

## NOTE

The following awards, for study at the Harvard Medical School during the coming academic year, were recently announced: Victor Emmanuel Chapman Memorial Fellowship to Henri Debidour, of Paris, France, Jeffries Wyman Scholarship to Don W. Fawcett, M.D., of West Branch, Iowa, Daniel A. Buckley Scholarship to William J. Baker, M.D., of Cambridge, Frederick E. Parlin Scholarships to Irving M. London, 4C and Irving L. Pavlo, 3M, both of Malden, Massachusetts.

## CORRESPONDENCE

## A CHALLENGE

*To the Editor* It is indeed time to correct a misstatement which, for six or seven years, Dr Morris Fishbein has been repeatedly making in his arguments for the status quo of American medicine, including his latest contribution to the *Journal* namely, that the American Medical Association is a democratic organization with its corollaries, that the House of Delegates is representative of its membership and that the policies of the present management meet the approval of the majority of the members of the American Medical Association. The obvious untruth of these declarations of his is manifest from the following facts:

- 1 The voting for councilors by the constituent societies is not done by means of secret ballots.
- 2 The list of councilors presented by the nominating committees contains few names not of members past middle age who have served as officers in their district societies.
- 3 Only a small proportion of the members of the district societies attend even the meeting for the annual election of officers.
- 4 The delegates to the House of Delegates are chosen by the councilors, who at best represent only the oldest of the three age groups of members, some of whom have retired from practice.

- 5 The so-called Hunt Plan for local health councils, heartily endorsed by the Council of the Society, was decisively rejected by his own district society.
- 6 The older men in the Council include the most successful of their medical generation and are therefore satisfied with the present conditions of practice and ready to approve measures to prevent any change.
- 7 Many members of the district societies belonging to societies for specialists with no real interest in the American Medical Association are constrained to become fellows in the American Medical Association in order to retain their good standing in their respective special societies.
- 8 The *Journal of the American Medical Association* fails to provide a forum for the free and open discussion of mooted questions, contrary to the principles underlying any democratic organization.
- 9 There was a revolt against the clique that managed the American Medical Association before the transfer of the headquarters to Chicago and the general housecleaning at that time.

I challenge the present management of the American Medical Association and the House of Delegates to permit the members to vote by postal cards their approval or disapproval of the retention of those leading spokesmen who have brought such disrepute upon organized medicine.

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## ERRATUM

*To the Editor* In a paper read by me before the Massachusetts Medical Society in Boston on May 31, 1938, and published in the *New England Journal of Medicine* on September 8, 1938, I inadvertently made a very foolish blunder.

The last sentence of the last complete paragraph in the first column on page 335 ends as follows: "354 patients with some sort of peritoneal involvement, with 20 deaths, a mortality of 5.6 per cent." The number "354" appears earlier in the same paragraph, and was carelessly repeated. The section should read: "271 patients with some sort of peritoneal involvement, with 20 deaths, a mortality of 7.4 per cent."

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## REPORTS OF MEETINGS

## NEW ENGLAND OTOLOGICAL AND LARYNGOLOGICAL SOCIETY

The following are abstracts of the papers presented at the November 15, 1938, meeting, in Boston, of the New England Otological and Laryngological Society.

**A CASE OF CARDIOSPASM WITH AUTOPSY REPORT** Dr. Harry Butler, Bangor, Maine.

A twenty-nine year-old woman with a history of cardiospasm was referred to the author. Medical examination and roentgen ray studies had failed to show any cause for regurgitation of food over a period of two years, other than fibrosis of the lower end of the esophagus. The esophageoscopic picture was typical of cardiospasm.

and that there have been four or five such cancers of the small bowel at the hospital during the past several years.

The second case, presented by Dr James Hawkins, was also from the medical service. A forty-seven year-old Italian-born waiter was admitted on December 17, 1938, with a chief complaint of nausea and vomiting, together with pain in the epigastrium two fingerbreadths above the umbilicus, of three weeks' duration. The patient was first seen in 1931 in the outpatient department for hemoptysis, a productive cough and chest pain, of two weeks duration. He had a history of four or five years of similar symptomatology, having had pneumonia in 1922. He had had epigastric discomfort and vomiting since 1918. This vomiting was characterized by being easily brought on and the vomitus often contained food material ingested eighteen to twenty hours before. At that time the patient was referred to the hospital for x-ray study, which showed consolidation of the right lower lobe with abscess formation and calcification. He was treated for three months with arsphenamine, and then with neoarsphenamine, with improvement of his condition. He felt well and had only a moderate cough and no acute episodes until September, 1935, when he returned with pain in the left lower quadrant, constipation and mucus in the stools. This gradually cleared up with conservative treatment. In December, 1937, he had pain two fingerbreadths above the umbilicus, coming on one hour after meals and markedly relieved by treatment with tincture of belladonna and a Sippy diet.

In December, 1938, a recurrence of the pain proved intractable to treatment with a Sippy regime and antispasmodics. An x-ray film taken at that time revealed cardiospasm and irregularity of the duodenal cap. The patient was referred to the hospital, complaining of pain and regurgitation. Physical examination revealed relative dullness over the right base with bronchovesicular breathing and occasional rales over both bases medially. The abdomen was negative except for a palpable cecum and descending colon. He was put on a soft solid diet without improvement. X-ray films of the chest showed no change. Bronchoscopy revealed no obstruction of the bronchi, merely calcified nodes. Esophagoscopy revealed no lesion, and a gastrointestinal series demonstrated a duodenal ulcer, in addition to coarse rugae and some evidence of inflammation of the lower end of the esophagus. Esophageal lavages were instituted, with improvement in the patient's symptoms.

Dr Emery, in commenting on the case, described it as being unusual in having three common conditions at one time—duodenal ulcer, cardiospasm and lung abscess. It suggested to him three interesting questions. Was the lung abscess secondary to the cardiospasm, as a result of inhalation of food? Did the ulcer exert a detrimental effect on the cardiospasm? What was the significance of the unusual esophageal dilatation, which was more pronounced in the upper half than at the lower end?

Dr Cutler accounted for the x-ray picture by stating that the once dilated esophagus was contracted as a result of irritability. He suggested a diagnosis of acute esophagitis due to aberrant gastric mucosa, based on references and his personal experience. Dr Emery pointed out that this had been considered but that no hydrochloric acid had been found in the esophagus. Dr Chester Jones's comment was that the story of a mucous colitis was a common finding in cardiospasm, and that after years of persistence, cardiospasm does give a picture of esophagitis. Dr John Homans questioned the veracity of the x-ray because of the queer twist of the esophagus at its lower end.

Dr Emery introduced Dr W Osler Abbott, of the University of Pennsylvania, as the speaker of the evening. The

subject was 'The Role of Intubation in the Study and Treatment of the Small Intestine.' Dr Abbott briefly described the historical development of intubation, illustrating with lantern slides.

The first intubation of the gastrointestinal tract was performed and described in 1813 by a Philadelphian, Dr Philip Physick, who went to the rescue of two children who had swallowed laudanum, one forty minutes after the other. He catheterized their stomachs and was able to save the first, but the second child died. In 1909, Dr Grodigen observed a fowl swallow a length of string, and shortly thereafter was able to see both ends of the string. He immediately experimented on a child on his pediatric service and obtained the same results, although it took a number of days to consummate the exit. Others tried similar experiments.

There are three main principles involved: first, an aspiration tube, second, a thin-walled rubber balloon at its tip upon which peristaltic action can exert a force, and, third, a separate accompanying tube, or a septal division of the aspirating tube, to inflate or deflate the balloon at will. Dr Abbott took a very minor share of the credit in this study to himself, naming several co-workers.

A study was made of the content of the fasting small intestine in a volunteer human subject, and a chart of the reaction and osmotic pressure was shown. The reaction of the duodenal contents is not so alkaline as statements have led one to believe. By samples taken at different distances down the intestine, it was found that the pH gradually approaches that of the blood, and although some readings were higher, the average readings at any stated level never reached pH 7.4. Three hundred milliosmols per liter being taken as the osmotic pressure of the blood, it was found that in the duodenum the contents were hypotonic and rose almost to blood level lower down in the intestine. Practical aspects of this study have a bearing on the problem of how to alter the reaction of intestinal contents as, for instance, in anemia, where it is well known that iron is better absorbed in an alkaline medium. It was recognized that the condition of the bowel contents is dependent on the activity of the bowel as much as on its secretions. When hydrochloric acid was given by mouth, the rate of flow remained unchanged whereas the pH rose. When sodium bicarbonate was given by mouth, even far down the intestine a striking increase in rate of flow was demonstrable, together with a rise in pH. This explains the laxative effect of soda. Higher concentrations of soda solutions had no effect, and water given alone increased the rate of flow slightly and lowered the pH. When glucose was given in a wide variety of concentrations and amounts, it was found that the concentration of glucose recovered by the aspiration tube in the jejunum and ileum was always below 54 gm per 100 cc., that is, isotonic, except when the subject received a tumbler full of pure syrup. The rate of flow in the intestine was much increased by the ingestion of glucose. Since it had been found that the intestinal osmotic pressure was quite stable in spite of a descending decrease in glucose concentration, determinations of chloride concentrations were carried out, which demonstrated a descending increase to balance the glucose decrease.

The absorption of glucose from the gastrointestinal tract offered itself as the next subject for study. The first observation, based on the figures above, was that the more dilute solutions were better absorbed. In this study, a three lumen tube was used and at least two balloons, thus simulating the experiments with surgically isolated loops of bowel in animals but being much nearer the normal state by isolating lengths of bowel between any two inflated balloons. This method seems to be technically re-

to be more or less cut off from the rest of their fellow beings

The various forms of hearing aids, electric or non-electric, were described and discussed. One fact must be borne in mind there is no 'best' hearing aid. Not only must the type and degree of the deafness be considered, but many other factors come into play to make a hearing aid useful to one patient and useless to another. A properly fitted hearing aid must not only increase the power of the sounds transmitted but must also avoid distortion and adventitious noises. Clarity is just as important as loudness. The need for fighting unethical advertising on the part of manufacturers and dealers is obvious, for the deaf have always been a ready prey for those who promise them relief. The Boston Better Business Bureau has recently taken action to stop such advertising. Although hearing aids can transform the deaf into useful, happy individuals, it must be remembered that they have definite limitations. They do not raise the hearing level to anywhere near the normal points. Lip reading must always be ready to do its share in filling in the gaps left by the hearing aid, especially in the transmission of consonants. Finally the speaker reminded the audience of the services rendered by the Boston Guild for the Hard of Hearing as a clearing house on all phases of deafness.

**Discussion.** The paper was discussed by Drs. Mosher, MacCready, Hill and Tobey. It was said that it was one of the pleasantest on this subject ever given and that it cleared up a great many points as to the uses of hearing aids.

**SURGICAL TECHNIC FOR THE CONSERVATION OF THE HEARING IN CHRONIC MASTOIDITIS** (This paper appeared in full in *The Laryngoscope* for July, 1938.) Dr. J. Morris Smith, New York City (by invitation).

The author stated that he believes that it is impossible to deal with all cases of chronic mastoid infection by the use of one type of operation. The degree of necrosis encountered in the different cases should determine the surgical technic employed. Four types of procedure are recommended.

The complete simple mastoid operation is indicated where the removal of the drum and ossicles is not necessary. It consists essentially of the usual simple mastoidectomy plus a wide exposure of the attic by dissection of the bone at the root of the zygoma. The middle ear is cleaned of polypi or granulations through the external canal. The aftertreatment consists of cleansing irrigations from the mastoid wound, as well as from the canal. This technic, which is especially indicated in young children, will frequently result in a dry ear, with the preservation of valuable hearing.

The second technic differs from the first in that the incus is removed in order to facilitate the removal of granulations from the attic. The author claims that the removal of the incus has remarkably little effect on the hearing.

In cases where the hearing in the other ear has been lost, or in the presence of an extensive bilateral infection where the preservation of the hearing may be vitally important the third technic is employed. This the author calls the new radical operation. It is devised to care for some of the cases requiring removal of the malleus and the incus without, however, necessitating the complete radical operation. The technic is as in the second type except for the removal of the malleus and the remaining portions of the drum membrane. The external canal and its lining are left intact. The aftertreatment includes irrigations and careful drainage. In the author's opinion

this operation will be successful in many cases in which formerly the complete radical operation would have been used.

The complete radical operation is resorted to in complicated cases or where one of the above procedures has failed to check the progress of the disease. Ossiculectomy is not advised, since it leaves the operator as well as the patient in the dark concerning the extent of the necrosis beyond the attic.

#### HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital, Tuesday evening, January 10, Dr. E. Stanley Emery presiding.

The first case from the medical wards was presented by Dr. J. C. Nunemacher. The patient, a seventy-year-old man, had been admitted two weeks previously with a complaint of increasing diarrhea and edema of the legs. His history went back to 1930, at which time he had mild constipation. In 1931 he developed slight nausea and vomiting, and in 1932 added the symptom of diarrhea. A year later, in December, 1933, abdominal pain and distention set in. The pain occurred first above the umbilicus, then below, and became more severe. During bouts of twelve to fifteen hours duration, the patient vomited once an hour, the vomitus being fecal in character. At that time he was admitted to the surgical service of the hospital. Physical examination revealed marked dehydration, distention of the abdomen and visible peristalsis. An x-ray film revealed small bowel obstruction. At operation 165 cm. of ileum was resected, following a diagnosis of tumor. The pathological report stated that the lesion was a carcinoid, with some malignant degeneration of the cells and with metastases to the mesentery. The patient was discharged after a slow convalescence, and subsequently did well.

In 1936 and 1937, a gastrointestinal series and a barium enema were negative. In 1938, a mass in the right lower quadrant the size of an orange was made out, which by June had increased its diameter to 10 cm. and was accompanied by increasing diarrhea and edema of the legs. The patient was admitted to the medical service at that time. For two and a half months every form of treatment was unavailing, and he had been discharged three weeks previously.

A week later he was again readmitted, feeling very weak. Four injections of mercupurin within a month's time had given him some relief. Physical examination revealed a blood pressure of 140 systolic, 90 diastolic, a systolic apical murmur, shifting abdominal dullness, a mass in the right lower quadrant thought to be an enlarged liver, and a mass in the left upper quadrant which might have been the spleen, since its surface was smooth. He had several telangiectases on the abdomen and purpuric spots on the back. The urine showed albumin, a specific gravity of 1.030, occasional white cells and numerous casts. The blood hemoglobin was 80 per cent, the red-cell count 4,000,000, and the white-cell count 6000. His stools were light yellow, mushy, but showed no occult blood.

Dr. Elliott C. Cutler asked whether the medical service considered the present condition to be due to the tumor or to some accessory factor. Dr. Emery replied that he thought it was a continuation of the same disease that had caused operation. He mentioned the fact that the case was an unusual one in that such tumors were not usually considered malignant and put the question as to why this tumor should produce diarrhea. Dr. Cutler stated that this type of tumor was not so rare as surgeons usually believe.

and that there have been four or five such cancers of the small bowel at the hospital during the past several years.

The second case, presented by Dr James Hawkins, was also from the medical service. A forty seven year-old Italian-born waiter was admitted on December 17, 1938, with a chief complaint of nausea and vomiting, together with pain in the epigastrium two fingerbreadths above the umbilicus, of three weeks duration. The patient was first seen in 1931 in the outpatient department for hemoptysis, a productive cough and chest pain, of two weeks duration. He had a history of four or five years of similar symptomatology, having had pneumonia in 1922. He had had epigastric discomfort and vomiting since 1918. This vomiting was characterized by being easily brought on and the vomitus often contained food material ingested eighteen to twenty hours before. At that time the patient was referred to the hospital for x ray study which showed consolidation of the right lower lobe with abscess formation and calcification. He was treated for three months with arsphenamine, and then with neoarsphenamine, with improvement of his condition. He felt well and had only a moderate cough and no acute episodes until September, 1935, when he returned with pain in the left lower quadrant, constipation and mucus in the stools. This gradually cleared up with conservative treatment. In December, 1937, he had pain two fingerbreadths above the umbilicus, coming on one hour after meals and markedly relieved by treatment with tincture of belladonna and a Sippy diet.

In December, 1938, a recurrence of the pain proved intractable to treatment with a Sippy regime and antispasmodics. An x ray film taken at that time revealed cardiospasm and irregularity of the duodenal cap. The patient was referred to the hospital, complaining of pain and regurgitation. Physical examination revealed relative dullness over the right base with bronchovesicular breathing and occasional rales over both bases medially. The abdomen was negative except for a palpable cecum and descending colon. He was put on a soft solid diet without improvement. X ray films of the chest showed no change. Bronchoscopy revealed no obstruction of the bronchi, merely calcified nodes. Esophagoscopy revealed no lesion, and a gastrointestinal series demonstrated a duodenal ulcer, in addition to coarse rugae and some evidence of inflammation of the lower end of the esophagus. Esophageal lavages were instituted, with improvement in the patient's symptoms.

Dr Emery, in commenting on the case, described it as being unusual in having three common conditions at one time—duodenal ulcer, cardiospasm and lung abscess. It suggested to him three interesting questions. Was the lung abscess secondary to the cardiospasm, as a result of inhalation of food? Did the ulcer exert a detrimental effect on the cardiospasm? What was the significance of the unusual esophageal dilatation, which was more pronounced in the upper half than at the lower end?

Dr Cutler accounted for the x ray picture by stating that the once dilated esophagus was contracted as a result of irritability. He suggested a diagnosis of acute esophagitis due to aberrant gastric mucosa, based on references and his personal experience. Dr Emery pointed out that this had been considered but that no hydrochloric acid had been found in the esophagus. Dr Chester Jones's comment was that the story of a mucous colitis was a common finding in cardiospasm, and that after years of persistence, cardiospasm does give a picture of esophagitis. Dr John Homans questioned the veracity of the x ray because of the queer twist of the esophagus at its lower end.

Dr Emery introduced Dr W. Osler Abbott, of the University of Pennsylvania, as the speaker of the evening. The

subject was 'The Role of Intubation in the Study and Treatment of the Small Intestine.' Dr Abbott briefly described the historical development of intubation, illustrating with lantern slides.

The first intubation of the gastrointestinal tract was performed and described in 1813 by a Philadelphian, Dr Philip Physick, who went to the rescue of two children who had swallowed laudanum, one forty minutes after the other. He catheterized their stomachs and was able to save the first, but the second child died. In 1909, Dr Grodigen observed a fowl swallow a length of string, and shortly thereafter was able to see both ends of the string. He immediately experimented on a child on his pediatric service and obtained the same results, although it took a number of days to consummate the exit. Others tried similar experiments.

There are three main principles involved: first, an aspiration tube; second, a thin walled rubber balloon at its tip upon which peristaltic action can exert a force; and, third, a separate accompanying tube, or a septal division of the aspirating tube, to inflate or deflate the balloon at will. Dr Abbott took a very minor share of the credit in this study to himself, naming several co-workers.

A study was made of the content of the fasting small intestine in a volunteer human subject, and a chart of the reaction and osmotic pressure was shown. The reaction of the duodenal contents is not so alkaline as statements have led one to believe. By samples taken at different distances down the intestine, it was found that the pH gradually approaches that of the blood, and although some readings were higher, the average readings at any stated level never reached pH 7.4. Three hundred milliosmols per liter being taken as the osmotic pressure of the blood, it was found that in the duodenum the contents were hypotonic and rose almost to blood level lower down in the intestine. Practical aspects of this study have a bearing on the problem of how to alter the reaction of intestinal contents as, for instance, in anemia, where it is well known that iron is better absorbed in an alkaline medium. It was recognized that the condition of the bowel contents is dependent on the activity of the bowel as much as on its secretions. When hydrochloric acid was given by mouth, the rate of flow remained unchanged whereas the pH rose. When sodium bicarbonate was given by mouth, even far down the intestine a striking increase in rate of flow was demonstrable, together with a rise in pH. This explains the laxative effect of soda. Higher concentrations of soda solutions had no effect, and water given alone increased the rate of flow slightly and lowered the pH. When glucose was given in a wide variety of concentrations and amounts, it was found that the concentration of glucose recovered by the aspiration tube in the jejunum and ileum was always below 54 gm. per 100 cc., that is, isotonic, except when the subject received a tumbler full of pure syrup. The rate of flow in the intestine was much increased by the ingestion of glucose. Since it had been found that the intestinal osmotic pressure was quite stable in spite of a descending decrease in glucose concentration, determinations of chloride concentrations were carried out, which demonstrated a descending increase to balance the glucose decrease.

The absorption of glucose from the gastrointestinal tract offered itself as the next subject for study. The first observation, based on the figures above, was that the more dilute solutions were better absorbed. In this study, a three lumen tube was used and at least two balloons, thus simulating the experiments with surgically isolated loops of bowel in animals but being much nearer the normal state by isolating lengths of bowel between any two inflated balloons. This method seems to be technically re-

to be more or less cut off from the rest of their fellow beings

The various forms of hearing aids, electric or non-electric, were described and discussed. One fact must be borne in mind there is no best hearing aid. Not only must the type and degree of the deafness be considered, but many other factors come into play to make a hearing aid useful to one patient and useless to another. A properly fitted hearing aid must not only increase the power of the sounds transmitted but must also avoid distortion and adventitious noises. Clarity is just as important as loudness. The need for fighting unethical advertising on the part of manufacturers and dealers is obvious, for the deaf have always been a ready prey for those who promise them relief. The Boston Better Business Bureau has recently taken action to stop such advertising. Although hearing aids can transform the deaf into useful, happy individuals, it must be remembered that they have definite limitations. They do not raise the hearing level to anywhere near the normal points. Lip reading must always be ready to do its share in filling in the gaps left by the hearing aid, especially in the transmission of consonants. Finally the speaker reminded the audience of the services rendered by the Boston Guild for the Hard of Hearing as a clearing house on all phases of deafness.

**Discussion.** The paper was discussed by Drs. Mosher, MacCreedy, Hill and Tobey. It was said that it was one of the pleasantest on this subject ever given and that it cleared up a great many points as to the uses of hearing aids.

**SURGICAL TECHNIC FOR THE CONSERVATION OF THE HEARING IN CHRONIC MASTOIDITIS** (This paper appeared in full in *The Laryngoscope* for July, 1938.) Dr. J. Morrissey Smith, New York City (by invitation)

The author stated that he believes that it is impossible to deal with all cases of chronic mastoid infection by the use of one type of operation. The degree of necrosis encountered in the different cases should determine the surgical technic employed. Four types of procedure are recommended.

The complete simple mastoid operation is indicated where the removal of the drum and ossicles is not necessary. It consists essentially of the usual simple mastoidectomy plus a wide exposure of the attic by dissection of the bone at the root of the zygoma. The middle ear is cleaned of polypi or granulations through the external canal. The aftertreatment consists of cleansing irrigations from the mastoid wound, as well as from the canal. This technic, which is especially indicated in young children, will frequently result in a dry ear, with the preservation of valuable hearing.

The second technic differs from the first in that the incus is removed in order to facilitate the removal of granulations from the attic. The author claims that the removal of the incus has remarkably little effect on the hearing.

In cases where the hearing in the other ear has been lost, or in the presence of an extensive bilateral infection where the preservation of the hearing may be vitally important, the third technic is employed. This the author calls the new radical operation. It is devised to care for some of the cases requiring removal of the malleus and the incus without, however, necessitating the complete radical operation. The technic is as in the second type except for the removal of the malleus and the remaining portions of the drum membrane. The external canal and its lining are left intact. The aftertreatment includes irrigations and careful drainage. In the author's opinion

this operation will be successful in many cases in which formerly the complete radical operation would have been used.

The complete radical operation is resorted to in complicated cases or where one of the above procedures has failed to check the progress of the disease. Ossiculectomy is not advised, since it leaves the operator as well as the patient in the dark concerning the extent of the necrosis beyond the attic.

#### HARVARD MEDICAL SOCIETY

A meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital, Tuesday evening, January 10, Dr. E. Stanley Emery presiding.

The first case from the medical wards was presented by Dr. J. C. Nunemacher. The patient, a seventy-year-old man, had been admitted two weeks previously with a complaint of increasing diarrhea and edema of the legs. His history went back to 1930, at which time he had mild constipation. In 1931 he developed slight nausea and vomiting, and in 1932 added the symptom of diarrhea. A year later, in December, 1933, abdominal pain and distention set in. The pain occurred first above the umbilicus, then below, and became more severe. During bouts of twelve to fifteen hours' duration, the patient vomited once an hour, the vomitus being fecal in character. At that time he was admitted to the surgical service of the hospital. Physical examination revealed marked dehydration, distention of the abdomen and visible peristalsis. An x-ray film revealed small bowel obstruction. At operation 165 cm. of ileum was resected, following a diagnosis of tumor. The pathological report stated that the lesion was a carcinoid, with some malignant degeneration of the cells and with metastases to the mesentery. The patient was discharged after a slow convalescence, and subsequently did well.

In 1936 and 1937, a gastrointestinal series and a barium enema were negative. In 1938, a mass in the right lower quadrant the size of an orange was made out, which by June had increased its diameter to 10 cm. and was accompanied by increasing diarrhea and edema of the legs. The patient was admitted to the medical service at that time. For two and a half months every form of treatment was unavailing, and he had been discharged three weeks previously.

A week later he was again readmitted, feeling very weak. Four injections of mercupurin within a month's time had given him some relief. Physical examination revealed a blood pressure of 140 systolic, 90 diastolic, a systolic apical murmur, shifting abdominal dullness, a mass in the right lower quadrant thought to be an enlarged liver, and a mass in the left upper quadrant which might have been the spleen, since its surface was smooth. He had several telangiectases on the abdomen and purpuric spots on the back. The urine showed albumin, a specific gravity of 1.030, occasional white cells and numerous casts. The blood hemoglobin was 80 per cent, the red-cell count 4,000,000, and the white-cell count 6000. His stools were light yellow, mushy, but showed no occult blood.

Dr. Elliott C. Cutler asked whether the medical service considered the present condition to be due to the tumor or to some accessory factor. Dr. Emery replied that he thought it was a continuation of the same disease that had caused operation. He mentioned the fact that the case was an unusual one in that such tumors were not usually considered malignant and put the question as to why this tumor should produce diarrhea. Dr. Cutler stated that this type of tumor was not so rare as surgeons usually believe.



# ICES

## VAL

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ice at the Hotel Kenmore, 490 Commonwealth  
e, Boston Telephone KENmore 2770

## ON DOCTORS HONY ORCHESTRA



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Orchestra, conducted by Nicolas  
Slonumsky, are held every Thurs-  
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Hotel, Brookline (BEA 2430)

## IN T BOTTOMLEY MEDICAL SOCIETY

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WILLIAM J MACDONALD, M.D., *Secretary*

## ULKNER HOSPITAL INICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the  
ulkner Hospital will be held on Thursday, May 4, at  
10 p m There will be a discussion of cases by Drs  
E Barton and J R Torbert.  
Physicians and medical students are cordially invited  
attend

## SEPH H. PRATT DIAGNOSTIC OSPITAL

Bennet Street, Boston  
Auditorium, 9-10 a m

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## CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Salem	May 1	Harold C Bean
Haverhill	May 3	Arthur T Legg
Lowell	May 5	Albert H. Brewster
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Worcester	May 19	John W O'Meara
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Hyannis	May 23	Paul L. Norton

## MASSACHUSETTS SOCIETY FOR SOCIAL HYGIENE

The annual meeting of the Massachusetts Society for  
Social Hygiene will be held at the Hotel Sheraton, on  
Wednesday afternoon, May 3, at 4 o'clock.

Mr W Linwood Chase, headmaster of the Country Day  
School for Boys in Newton, will speak on 'Sex Educa-  
tion The school's responsibility to the home and the  
child

Dr George G Smith will present the annual report, and  
Mr George N Northrop, headmaster of the Roxbury  
Latin School, will give a brief report for the Committee  
on Sex Education in the School Program. Tea will be  
served

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MAY 1

#### MONDAY MAY 1

4 p m Physicians and medical students are cordially invited to  
attend a clinic presented by the medical surgical and orthopedic  
services of the Infants and Children's hospitals in the amphitheater of the Children's Hospital

liable. Kymographic tracings through these balloons were taken concomitantly. It was found that, with increasing concentrations of glucose placed in an isolated bowel segment, the amount recovered after a certain period of time increased and that isotonic solutions produced normal bowel activity, which became hyperactive on giving hypotonic glucose. The fact that the rate of glucose absorption, as measured by plotting a curve of different concentrations given, was found to be about 1 gm in fifteen minutes, together with the first observation that reduction in recoverable concentrations is very rapid as one goes down the bowel and that even in the jejunum this reduction is marked, implies that absorption mainly occurs above the latter segment. The rate of admission of contents into the small intestine and the rate of absorption therefrom being fixed, we must assume that the old idea that glucose is not absorbed from the stomach is no longer tenable. However, what was concluded from this study confirms the old theory namely, that absorption occurs by diffusion and also by a special mechanism whereby it occurs more rapidly from dilute solutions than can be explained on a basis of diffusion alone. Practical aspects of this study, in deranged absorption, have been reported by Groen, of Amsterdam.

The use of intubation in studying the action of drugs is apparent. The investigators chose morphine for their subject and checked with fluoroscopy their findings by aspiration and by balloon tracings. The average clinical dose of the drug was injected in the deltoid muscle (a control of plain water being given in certain cases), whereon the tracing from the duodenum showed an intense contraction which lasted twenty to forty minutes, followed by a relaxation which reached its maximum and remained for about one hundred and sixty minutes. Normally the duodenal tracing showed a slightly greater amount of activity than that from the ileum. In this experiment, the ileum showed at the same time only a slight increase in tonus, and the lower ileum traced queer alternate periods of relaxation and contraction. Morphine, then, increases the duodenal resistance and the gastric contents are held back, in about thirty minutes the duodenal resistance decreases, the gastric contents spill over, and the jejunal flow is less steeply downhill toward the lower bowel. On this basis it is possible to explain the death of one of Dr. Physick's patients while the other lived the latter was intubated at least forty minutes after the former!

Intubation is useful in gastroenterostomy. Whereas formerly there was the problem of starvation of the patient as a result of edema of the wound, now the surgeon can place the double lumen tube before completing the sutures, and after the operation is ended the patient can have the stomach contents aspirated, and at the same time be fed by a tube which goes 30 cm into his small intestine.

The most important use of intubation is in the field of intestinal obstruction. Brinton, fifty years ago, claimed there was no such thing as reverse peristalsis (except above the ligament of Treitz), and Dr. Abbott and his associates think that he is right. In addition to finding that the tube with the balloon at its tip was easily carried down by peristaltic action to the point of obstruction, the investigators had an opportunity to observe an obstructed patient who had been given barium by mouth by mistake. The conclusion is that reverse peristaltic waves are in fact, reflected waves. An analogy was made with a piston, its center bored through to form a ring, moving downward in a cylinder. As it moves down next the wall of the cylinder, the contents are displaced upward in a central

stream. So with intestinal contents above an obstruction. By means of intubation tracings it was also found that moderate distention of the bowel increases peristaltic action but that pathologic distention stops it, except in the case of intestinal obstruction due to irritation from outside the bowel, which produces spasm.

Dr. Abbott next reported three of his cases of intestinal obstruction to emphasize the extent of the therapeutic value of intubation in the emptying of the distended gut and the removal of the obstruction. Surgery, as the earliest form of treatment for intestinal obstruction, had a mortality of roughly 40 per cent. The Wangenstein tube reduced this figure to about 25 per cent, but it was ineffective in deflating below the obstruction and did not provide for giving the patient nutriment. The method of intubation has attacked these latter problems.

The first case described had had a five-day history of paralytic ileus with tremendous distention. No benefits were obtained by duodenal suction, and an exploratory laparotomy was likewise unsuccessful. The patient was intubated and deflated and was then fed glucose. He convalesced uneventfully.

The second case was that of a forty-seven-year-old laborer, who came in with perforated ulcer. He had a temperature of 104°F, was distended and had peritonitis and a hemolytic streptococcal septicemia. He was intubated under the fluoroscope. After seven days his bowels moved, but his abdomen became riddled with localizing abscesses. He practically recovered and then came down again with distention, vomiting and signs of obstruction. He was again intubated, deflated and made comfortable. The site of obstruction was then demonstrated by barium passed in by the tube,—a seemingly heretical procedure which is no longer contraindicated because the heavy barium can be readily aspirated out after the demonstration,—and the abdomen was opened and the binding adhesions divided surgically.

The third case reported had an eight year story of ileitis and included five operations, the details of which were not known. This time the patient had been partially obstructed for a week, and completely so for three days. He had constant fecal vomiting and tetanic convulsions, and his lower extremities were cyanotic as in partial collapse. The patient was intubated and thirty-six hours later, when he was brought down to be fluoroscoped, he was reading the paper. The barium passed in by tube demonstrated a former ileocolostomy, and soon after, a resection of the demonstrated diseased ileitic area was done, the patient at operation being comfortable and in fluid balance. Thus it was shown that not only is intubation of value in deflating distention but also in feeding and in correcting the fluid imbalance, the drainage fluid from the bowel can be measured, allowing a basis for determining replacement therapy.

Dr. Abbott concluded his presentation by discussing results. He said that Dr. Johnson at the Detroit Receiving Hospital had reported a mortality of 93 per cent in cases of obstruction without gangrene so treated. The whole point, of course, is to have the clinical acumen to distinguish between strangulation and non-strangulation. If strangulated hernia can be ruled out, Dr. Abbott believes that most cases may be treated by intubation. As for obstruction in the colon, it can be better treated by cecostomy. Multiple obstruction can be treated to give relief by deflation only down to the first point. Dr. Abbott showed charts illustrating his results. In 47 intubated cases there was technical failure in only 6, and 31 out of 33 serious cases were technically successful.

NOTICES

REMOVAL

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OSTON DOCTORS SYMPHONY ORCHESTRA



Nicolas Slonimsky

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## TUESDAY MAY 2

- \*9 10 a m Diagnosis of Certain Hip Conditions Dr J D Adams  
Joseph H Pratt Diagnostic Hospital  
\*10 a m 12 30 p m Tumor clinic Boston Dispensary  
11 30 a m John T Bottomley Medical Society Carney Hospital

## WEDNESDAY MAY 3

- \*9 10 a m Hospital case presentation Dr R W Buck Joseph H Pratt Diagnostic Hospital  
\*12 m Clinicopathological conference Children's Hospital amphitheater  
4 p m Massachusetts Society for Social Hygiene The Sheraton Boston

## THURSDAY MAY 4

- \*9 10 a m The Management of Bleeding in Obstetrical Cases Dr A K Paine Joseph H Pratt Diagnostic Hospital  
\*5 p m Faulkner Hospital clinicopathological conference

## FRIDAY MAY 5

- \*9 10 a m The Management of Chronic Alcoholism Dr Merrill Moore Joseph H Pratt Diagnostic Hospital  
\*10 a m 12 30 p m Tumor clinic Boston Dispensary  
12 m outpatient conference, Massachusetts General Hospital lower outpatient amphitheater

## SATURDAY MAY 6

- \*9 10 a m Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital  
\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

\*Open to the medical profession

- APRIL 28—New England Heart Association Page 649 issue of April 13  
APRIL 30—Health Lecture Quincy City Hospital Page 636 issue of February 23  
MAY 2—John T Bottomley Society Page 727  
MAY 2 27—Medical Conference Program Joseph H Pratt Diagnostic Hospital Page 727  
MAY 3—Massachusetts Society for Social Hygiene Page 727  
MAY 3-6—American Association of Mental Defect Page 614 issue of April 6  
MAY 4—Faulkner Hospital clinicopathological conference Page 727  
MAY 7 15—International Congress of Military Medicine and Pharmacy Page 501 issue of September 29  
MAY 11—Pentucket Association of Physicians 8 30 p m Hotel Bartlett 95 Main Street Haverhill  
MAY 12 and 13—American Heart Association Page 542 issue of March 23  
MAY 13 16—American Board of Obstetrics and Gynecology Page 457 issue of March 9  
MAY 14 20—American Physicians Art Association Page 404 issue of March 2  
MAY 15 19—American Medical Association St Louis Missouri  
MAY 22 23 and 24—American Association for the Study of Gonorrhea Page 405 issue of March 2  
JUNE 5 6 7 and 8—American Association of Industrial Physicians and Surgeons Page 581 issue of March 30  
JUNE 6 7 and 8—Massachusetts Medical Society Worcester  
JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 125 issue of January 19  
JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8  
SEPTEMBER—Boston Psychoanalytic Institute Page 450 issue of September 22  
SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8  
SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24  
OCTOBER 23 NOVEMBER 3—New York Academy of Medicine Page 581 issue of March 30  
FALL, 1939—Temperature Symposium Page 218 issue of February 2

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH

MAY 10—Page 649 issue of April 13

## MIDDLESEX SOUTH

MAY 3—Page 688 issue of April 20

## SUFFOLK

MAY 4—Censors meeting Page 688 issue of April 20

## WORCESTER

MAY 10—Worcester Country Club—annual meeting

## BOOK REVIEWS

*Physiopathologie de la Vieillesse et Introduction à l'Étude des Maladies des Vieillards* P Bastai and G-C. Dognotti 235 pp Paris Masson et Cie, 1938 50 Fr fr

This monograph is an attempt to review in a systematic manner the more significant data concerning the morphological and functional changes that occur in old age. The first portion is devoted to an exposition of the significant alterations that can be observed or measured. Each of the major organs is considered in the first chapter. The second chapter deals in a general way with changes in biochemistry, hemodynamics and the special functions (respiration, digestion, urinary excretion and the sensations), and "neurohumoral control." Finally, there is a chapter discussing the significance of the various findings.

The second part deals more directly with diseases of old age. One chapter is devoted to 'senility considered as a disease,' another to diseases common to all ages, a third to arteriosclerosis and diseases peculiar to old age in which the relation is not clear.

The authors main thesis is that most, if not all, the problems of old age resolve themselves, in the last analysis, to a 'loss of capillary reserve' which alters the nutrition and the adaptability of all tissues.

The book is well written in a very simple style. It is well arranged and has a minimum of elaborate data. It is suited to the general reader who is looking for an interesting presentation and interpretation of many of the known peculiarities of old age. For the advanced student and investigator that portion dealing with the measurements of the peripheral circulation will be of particular interest. The authors apparatus for *angiodilatometrie* is described and is very similar to that used recently in this country for the measurement of blood flow in the extremities.

*The March of Medicine Selected addresses and articles on medical topics, 1913-1937* Ray L. Wilbur 280 pp Stanford Stanford University Press, 1938 \$2.75

Doctors and medical students who wish to orient themselves in the general problem of medical education would do well to own this book. As a practicing physician and as president of a great university the author is peculiarly fitted to trace the evolution of medical education in this country from the time when it was virtually a trade to the time when it assumed the definite complexion of a profession in close association with a university.

One finds twenty five years of experience packed within these two hundred and eighty pages. A careful reading of the book shows the author to be not alone the scholar he is but also a prophet of changes which were to come and, in truth, of which we today are a part. There can be nothing but profit for those who will read the addresses entitled "The Future of Medical Education," "Public Health and Human Welfare," "Eugenics," "The Eclipse of Magic," "The Medical Curriculum," "Mental Health as a National Problem," "Keeping the Doctor Up to Date," and "Medicine as a Pacemaker for Civilization." This book should be of absorbing interest to all premedical students, and can be recommended to practicing physicians with enthusiasm and the assurance that they will leave the reading of this book with a mind better prepared for their efforts.

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## AN ANALYSIS OF THE TREATMENT AND MORTALITY OF THREE HUNDRED AND NINETY CASES OF ACUTE AGRANULOCYTIC ANGINA\*

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THIS paper presents a critical analysis of the efficacy of various forms of treatment in 390 cases of acute agranulocytic angina reported in the literature since 1933. Papers confining themselves to summaries only and not giving actual case histories have not been included, for in such articles the data relative to both diagnosis and treatment are inadequate for proper study.

The evaluation of therapy by a survey of the literature is, of course, open to certain fundamental objections. It must, for instance, be remembered that therapeutic successes are more apt to be reported than are therapeutic failures, but this should be no truer for one type of treatment than for another, so that while the percentage of cures—under any form of treatment—is probably not so great as would appear from such a survey, it is improbable that any one group suffers more from this defect than does any other.

On the other hand, a survey of the existing literature has certain advantages in diseases such as that under consideration. It is impossible in the case of such an uncommon condition to have any one physician collect, in his own right, a series of sufficient magnitude to be of much statistical significance. Furthermore, from a statistical point of view, ten series of 10 cases each in the hands of so many different observers are probably more cogent than 100 cases under one man's control, for the personal element is largely eliminated. In any event, such a survey would seem, at present, the best available method of evaluating the various therapeutic agents so far advocated for this disease.

Leukopenia and neutropenia alone do not con-

stitute the disease acute agranulocytic angina. The efficacy of any therapeutic agent in agranulocytic angina cannot be judged by its effect in other conditions associated with leukopenia and neutropenia, be they ever so marked.

True acute agranulocytic angina, also known as agranulocytosis, malignant granulopenia and acute primary granulocytopenia, may be defined as an acute disease characterized by extreme leukopenia and granulopenia. The red cells and platelets are essentially unaltered. There are very rarely any hemorrhagic manifestations. There are no, or at most extremely few, very immature white cells in the blood at the height of the disease. Neither liver nor spleen is noticeably enlarged, nor is there any lymphadenopathy other than that which may readily be explained by local sepsis. Death may occur within thirty-six hours of the apparent onset. Recovery, if it takes place, usually occurs within two weeks. Relapses occur, though they are uncommon. Rarely the disease is cyclic. While the etiology is still in some doubt, there is general agreement that many cases are caused by amidopyrine, dinitrophenol and similar compounds.<sup>1</sup> The bone marrow shows what appears to be a maturation arrest in the granular white-cell series at the stem-cell or myeloblast stage.<sup>2, 3</sup>

This disease must be sharply differentiated from leukemia with a low white-cell count, aplastic anemia, leukopenia due to overwhelming sepsis and chronic leukopenia due to various causes. This is not the appropriate place to discuss the differential diagnosis.<sup>4, 5</sup>

Of 448 cases reported as agranulocytic angina, 58 must be discarded because a scrutiny of the case reports fails to substantiate that diagnosis and indicates that the proper diagnosis was aplastic anemia, pernicious anemia, overwhelming sepsis, Hodgkin's disease, leukemia or some other funda-

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mental disorder associated with chronic leukopenia

Seventy-five of the remaining 390 cases received no treatment aimed specifically at the bone-marrow dyscrasia. Death occurred in 78 per cent of these, a mortality rate essentially the same as that given by other authors.<sup>6,7</sup> It may therefore be concluded, with some degree of assurance, that the mortality when no specific treatment is given is in the vicinity of 75 or 80 per cent.

In order to determine the value of a specific method of therapy, the agent must be given in adequate amounts and sufficient time must be allowed for it to act. If inadequate amounts are administered, or if adequate amounts have been given but the patient succumbs before beneficial action could result, the case must be considered as inadequately treated. The following types of cases must be placed in this class:

(1) Those in which the patients died before the treatment could have had time to influence the bone marrow to renewed activity, as evidenced by the rise of white cells in the peripheral blood. This time interval varies with the particular type of therapy used and will be discussed later.

(2) Those in which the patients recovered or showed unquestionable hematologic response to therapy in a similar time interval.

(3) Those in which the patients died without receiving adequate amounts of a given therapeutic agent, no matter how long they may have been hospitalized.

(4) Those in which the patients recovered under similar circumstances.

It would be expected that the mortality of these inadequately treated cases would be approximately the same as that of a series that had received no specific therapy whatever. This proves to be the case. Of the 130 cases, death occurred in 95, or 73 per cent.

The parenteral use of liver extract was first suggested by Foran, Sheaff and Trimmer.<sup>8</sup> They used a commercial preparation of the "fraction G" of Cohn, and injected the material derived from 100 gm of liver into the vein or muscle every eight hours until a definite rise in the granulocytes or marked clinical improvement occurred. This dose has been accepted as the minimum requirement. Murphy<sup>9</sup> noted that "there was a prompt and often striking response in the number of white blood cells within a few hours of the beginning of treatment." Others have observed this phenomenon, but Witts, Willcox and Warner<sup>10</sup> point out that there is a definite fall in the leukocyte count in about eighteen hours, and conclude that liver produces a shock-like reaction suggesting peripheral mobilization of preformed cells rather than a stimulation of their production. It has also been claimed that the rise in white-cell

count in pernicious anemia following parenteral liver therapy indicates a stimulating action on the leukocytes, but the relative leukopenia of pernicious anemia is essentially a myelophthisic one, and the slow rise of the white-cell count in this disease under liver therapy is due largely, if not entirely, to the maturation of the immature red cells and the consequent return of the bone marrow architecture to a normal state, thus permitting the unhampered multiplication of leukocytes.

The advocates of liver therapy have set no definite time for the appearance of a favorable response after treatment, but seventy-two hours has been taken as an arbitrary standard, any recovery before this time is regarded as spontaneous, and any death is attributed to inadequate therapy.

Nine cases have been reported in which adequate amounts of liver extract were the only specific therapy used. Eight other cases in which liver extract only was used must be eliminated because of inadequate treatment or because the data presented were insufficient for purposes of analysis. In the 9 adequately treated cases, 7 patients recovered and 2 died, a mortality of 18 per cent.

It would seem from the above figures that liver therapy was definitely successful in the treatment of agranulocytic angina. However, there are 17 other cases reported in the literature in which adequate amounts of liver extract were used together with some other specific method of treatment. If liver were as successful in its effect as the results of the first 9 cases suggest, a similar success would be expected in these 17 cases, since there is no reason to believe that any of the other measures used would interfere with any possible beneficial action of the liver. Yet 14 of the 17 patients died, giving a mortality of 82 per cent. Combining the two series of cases, the mortality of agranulocytic angina treated with liver is found to be 62 per cent.

From these figures, it may be concluded that the 7 recoveries in the 9 cases treated with liver extract alone were due to chance, and that the 62 per cent mortality of the combined series is a more just evaluation of the usefulness of liver extract in agranulocytic angina.

Stimulating doses of x-rays were first introduced as a therapeutic measure in agranulocytic angina by Friedemann and Elkeles,<sup>11</sup> and have been used by many others since that time. There has been much conflict of opinion as to whether large or small doses should be used. Therefore, any therapeutic exposure has been considered to be adequate.

Only 5 cases have been reported in the literature since 1933 that were treated by x-ray alone. Of

these, 4, or 80 per cent, were fatal. The number of cases is too small to be significant. However, 22 other cases have been reported that have received x-ray treatment as well as some other form of therapy. Of these patients 14 died, a mortality of 64 per cent. The mortality for cases treated by x-ray alone and x-ray combined with some other form of therapy is therefore 67 per cent. The figure obtained in a series of 27 cases is probably significant, and the mortality of 67 per cent in this series, shows that x-ray therapy is of little value in the treatment of agranulocytic angina.

Transfusion has been suggested by some as a useful form of treatment. Any amount or number of transfusions have been considered adequate, and the time interval has been arbitrarily taken as seventy-two hours. Seventeen cases have been reported as treated by transfusion alone. Fourteen patients died, a mortality of 82 per cent, which is about the same as that of the untreated cases. Fifty-six cases were treated by transfusions together with some other type of therapy. Twenty-nine of these patients, or 53 per cent, died. The combined figures show that the mortality is 60 per cent.

There would seem to be a large discrepancy between the 82 per cent mortality of those cases receiving transfusions only and the 53 per cent mortality of the cases treated with transfusion together with other forms of therapy. But of these latter 56 cases, 24 also received adequate amounts of Pentnucleotide (N.N.R.) and 16 recovered. As 33 per cent is approximately the mortality of cases adequately treated with Pentnucleotide only,<sup>5</sup> and as the mortality of cases treated with transfusion alone is 82 per cent, it may properly be assumed that the recoveries in these 24 cases were due largely to Pentnucleotide. Therefore, the corrected mortality for cases treated by transfusion should be 74 per cent. The results in the entire series of cases receiving transfusion with or without other forms of therapy exclusive of those treated with Pentnucleotide indicate that transfusions decrease the mortality only 4 per cent. Transfusion, therefore, does not appear to alter materially the number of blood leukocytes or to affect favorably the bone marrow, and cannot be considered a specific remedy for agranulocytic angina.

Giffin and Watkins<sup>17</sup> have suggested that yellow bone marrow might be of value in agranulocytic angina on the theory that it contains a factor that overcomes the maturation arrest of the leukocytes. They recommend 300 to 500 gm of desiccated marrow taken by mouth. Marberg and Wiles<sup>17-18</sup> have treated patients with extracted bone marrow and report that a reaction may be expected in twenty-four to forty-eight hours. These latter

authors have treated 26 cases with this method, but report only 8 in enough detail to be considered from a statistical point of view. Four of these patients recovered when bone-marrow extract only was used, and 3 when the extract was used with some other form of therapy. In the remaining case, bone-marrow extract was given when the patient had obviously started to recover and after Pentnucleotide had been administered in full doses on each of the preceding four days. Three other cases have been reported that received adequate bone marrow along with other forms of therapy. Of these, 1 patient died. Thus the mortality of all cases treated with yellow bone-marrow extract is 10 per cent. Giffin and Watkins<sup>15</sup> have recently reported a series of 24 cases that received bone-marrow extract only. The results in the series were excellent, but unfortunately the cases were not presented in sufficient detail to be included in the present analysis.

It is impossible to draw any definite conclusions from such a small series, but the apparent success of this method of therapy should stimulate its further use and study. It is to be noted, however, that because of the frequent presence of necrotic lesions and edema in and about the mouth in cases of agranulocytic angina, swallowing is often difficult or even impossible, therefore, any method of therapy that depends on oral administration may be limited.

"Leukocytic cream" injections have been advocated by Strumia<sup>16</sup> as a means of specific therapy. The dose recommended by the author is the "cream" from 100 to 150 cc of whole normal human blood, injected intramuscularly daily. According to Strumia, a favorable response should be expected in from one to three days. He reports 5 cases treated by this method alone with 100 per cent recovery. One case has been reported where the treatment failed. Six additional cases have been reported where leukocytic cream was used with some other means of therapy. Of these patients, only 1 died. There is thus a combined mortality of 17 per cent. From such a small series one cannot draw any valid conclusions, yet the success in these cases warrants further study of this method of treatment.

Adenine sulfate was first advocated as a substance that might be specific in agranulocytic angina by Reznikoff<sup>17</sup> in 1930. At that time the dose recommended was 0.5 gm, injected intravenously twice daily. In 1933, Reznikoff<sup>13</sup> reported the results of 15 cases and set the standards for this method of treatment. The dosage then recommended was 1 gm, given intramuscularly three times a day, and recovery was expected to start in twenty-four to forty-eight hours. In the 15

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authors have treated 26 cases with this method, but report only 8 in enough detail to be considered from a statistical point of view. Four of these patients recovered when bone-marrow extract only was used, and 3 when the extract was used with some other form of therapy. In the remaining case, bone-marrow extract was given when the patient had obviously started to recover and after Pentnucleotide had been administered in full doses on each of the preceding four days. Three other cases have been reported that received adequate bone marrow along with other forms of therapy. Of these, 1 patient died. Thus the mortality of all cases treated with yellow bone-marrow extract is 10 per cent. Giffin and Watkins<sup>15</sup> have recently reported a series of 24 cases that received bone-marrow extract only. The results in the series were excellent, but unfortunately the cases were not presented in sufficient detail to be included in the present analysis.

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cases, only 5 patients lived longer than twenty-four hours and all survived. Eight cases must be classified as inadequately treated either because of dosage or the time element. One patient recovered after adequate amounts of adenine sulfate together with other supposedly specific therapeutic agents. One recovered with transfusion and inadequate amounts of adenine sulfate. One other case has been reported that was cured by using adenine sulfate alone. Three further cases are on record that received this drug along with other therapeutic agents. Two of these patients died. The mortality of all these 10 cases treated with adequate amounts of adenine sulfate with or without other presumably specific agents is therefore 20 per cent.

Although the series is small, the 20 per cent mortality indicates that adenine sulfate should be given a more extensive trial in the future. It should be noted that this drug is one of the essential degradation products of Pentnucleotide.

Pentnucleotide was first suggested as a form of therapy by Jackson et al.<sup>19</sup> in 1931. In 1924 one of us<sup>20</sup> showed that normal human blood contained appreciable quantities of nucleotide, and later Doan<sup>21</sup> demonstrated that intravenous injections of this substance raised the peripheral white-cell count in normal rabbits. Pentnucleotide may be given intramuscularly or intravenously. In agranulocytic angina, 10 cc of Pentnucleotide is given intramuscularly four times a day until the white-cell count has definitely risen and young neutrophils have appeared. In favorable cases, this change usually occurs from the third to the sixth day after the initiation of treatment. Ten cubic centimeters is then given once or twice a day until the white-cell count has been normal for several days. If there has been no response at the end of ten days, further therapy with Pentnucleotide is probably useless.<sup>5</sup> All cases which terminated fatally within forty-eight hours or which showed signs of recovery within seventy-two hours were considered as inadequately treated, and 20 cc a day was taken as the minimum dose simply because this smaller dose was originally recommended by Jackson. None of the cases previously reported by Jackson and Parker<sup>5</sup> are included in the present analysis.

Forty-one cases of agranulocytic angina have been reported since 1933 that have been treated by Pentnucleotide only. Of these patients 12, or 29 per cent, died. Forty-four patients have been reported treated with adequate amounts of Pentnucleotide as well as some other form of therapy. Of these 18, or 40 per cent, died. The total mortality of the two groups of 85 cases is 35 per cent.

The 35 per cent mortality for these 85 cases recorded in the literature is essentially the same as

Jackson and Parker's<sup>5</sup> mortality rate of 33 per cent reported in 1935 from a series of 103 cases.

The question may be raised as to whether it is proper to compare the mortality of patients treated with some specific therapy for at least seventy-two hours with that of patients who have not re-

*Mortality Rates Following Various Types of Treatment in 390 Cases of Acute Agranulocytic Angina*

TREATMENT	NO OF CASES	PERCENTAGE MORTALITY
Untreated	75	38
Inadequately treated	130	73
Liver extract	76	62
Alone	9	18
With other therapy	17	82
X ray	21	67
Alone	5	80
With other therapy	22	64
Transfusion	73	60
Alone	17	82
With other therapy	56	53
Alone and with other therapy exclusive of Pentnucleotide	49	74
Bone marrow	10	10
Alone	4	0
With other therapy	6	17
Leukocytic cream	12	17
Alone	6	17
With other therapy	6	17
Adenine sulfate	10	70
Alone	6	0
With other therapy	4	50
Pentnucleotide	85	35
Alone	41	29
With other therapy	44	40

ceived any specific therapy (untreated cases) and who in some cases have not lived long enough to receive the theoretical benefits of seventy-two hours of general hospital care. The mortality of those cases which did not receive specific therapy but which were hospitalized and given general care for more than three days has therefore been determined. Of the 43 patients in this group, 30 or 70 per cent, died. This figure is but slightly lower than that for the untreated cases. It would therefore appear that a notable reduction in the mortality rate by any presumably specific agent given over a period of seventy-two hours could properly be attributed to the therapy.

#### SUMMARY AND CONCLUSIONS

Three hundred and ninety cases recorded in the literature since 1933 as agranulocytic angina have been analyzed in order to evaluate so far as possible the efficacy of the various therapeutic agents advocated as specific or helpful.

The mortality in 75 untreated cases was found to be 78 per cent.

The mortality in 43 cases which received no specific therapy but which received more than three days of general hospital care was 70 per cent.

The mortality in the 130 cases receiving inadequate amounts of any supposedly specific therapy was 77 per cent.

Neither transfusions nor x-ray therapy seemed to alter the mortality rate

Treatment by yellow bone-marrow extract, leukocytic cream or adenine sulfate has not been widely enough reported upon to permit any accurate conclusions as to their worth. Because of the low mortality in the cases so far reported, these measures deserve further trial.

The mortality in the 26 cases treated with adequate amounts of liver extract was 62 per cent.

The mortality in the 85 cases treated with Pentnucleotide was 35 per cent, a figure closely approximating that reported by Jackson and Parker<sup>5</sup> in 1935. None of the latter cases are included in the present analysis.

At present, it would appear that Pentnucleotide in doses of at least 40 cc a day is the most promising form of specific therapy in this disease.

Only the references specifically referred to in the text are listed below. A complete bibliography will appear in the reprints.

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## A CONSTRUCTIVE PROGRAM OF MEDICAL CARE FOR THE LOW-INCOME GROUP\*

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ANY program for the medical care of the low-income group does not apply to the care of the indigent which is generally conceded to belong to government, either local, state or federal. Unfortunately the dividing line between the indigent and low-income groups is an exceedingly difficult one to draw, and the fact that it is drawn at different levels in different communities adds to the confusion.

The evidence is conclusive that medical care must be expensive for certain illnesses if it is to be good. Some provision, therefore, must be made for individuals in the low-income group to meet this cost, because all groups in our population must receive good medical care. Without trying to define just what the limits of income are for this group, it is fair to say that a very large number, probably more than half of our population, fall within it. Governmental compulsory health insurance has been suggested by the politicians

as the means to provide good medical care for this large low-income group. Although compulsory health insurance as developed in some instances, such as the system adopted by the Southern Pacific Railroad, results in satisfactory medical service, there are grave doubts in the minds of most of the members of the medical profession in regard to the quality of medical care under such a system when provided by the government. These doubts are based on the experiences in other countries where, although the people say they are satisfied with the care they receive under what amounts to compulsory health insurance, the evidence suggests that the type of medical service offered is far from ideal. Furthermore, the experience has been that under governmental compulsory insurance plans it has been difficult for the individual to remain the private patient of his family physician, and it is generally conceded that better medical service results if patients have one chief medical adviser or family physician who is familiar with the environment of the patient and who knows something of the patient's background. In addition

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tion to the possibility of deterioration in medical service under a governmental compulsory health insurance plan, it is evident that such a plan suddenly applied to this country would create a tremendous overhead expense which might well be avoided if the government only took over its share of the financial burden for the care of the low-income group as the need for it became evident along evolutionary lines

Many physicians believe that a constructive program can be worked out on a community basis so that the individual in the low-income group in any community may remain the private patient of his own physician without undue financial burden. The size of the individual community in which such a plan may be developed will naturally vary with the density of the population, the topography of the country and the means of transportation. The object of the plan is to spread throughout the community the cost of the medical care for the few unfortunate ones who have the types of illness that are expensive. In some communities, part of this cost can be borne by private philanthropy, as is done at the present time. Although large fortunes seem to be diminishing throughout the country, the endowment already involved in medical care will undoubtedly persist, and the ability to raise money for community chests suggests that additional funds from private sources will continue to be donated for this purpose for some years to come. However, private philanthropy will not be able to carry the entire load, and other means must therefore be developed to pay for the medical care of the individuals in the low-income group who need it. Some type of insurance against the expense of illness or financial assistance from public funds raised by taxation seems to be the most logical way to make up any deficiency after the resources of private philanthropy are exhausted.

With the development of the following three-point program in each community the individuals in the low-income group should be able to receive the best of medical care at a cost within their means. The program consists in (1) a community hospital, (2) a non-profit insurance plan for the payment of hospital bills, and (3) a non-profit insurance plan for the payment of physicians' bills or some type of group or contract practice.

#### COMMUNITY HOSPITALS

As most of the patients who have illness which is costly have to be hospitalized, each community should have a hospital available for all its citizens. In such a hospital there should be proper equipment for practically all diagnostic procedures and treatment. In this way the expense of

elaborate equipment for diagnosis and treatment will be borne by the community as a whole and will be available to all the citizens. In order to make it available to all citizens such a hospital must be opened to all *properly qualified* physicians of the community for the care of their private patients. Not many years ago only charity patients went to hospitals, and in order to avoid confusion in the care of these patients, the professional staffs of hospitals were limited to certain physicians. The result has been that in some communities still there is a tendency to believe that the staff of a hospital should be limited, but even if this is necessary, I believe it should only apply to the care of the charity patients. If a hospital is supported by the community, it is only proper that any member of the community should be allowed to be treated in the hospital by his own physician, provided that the physician is properly qualified. On the other hand, the trustees of such a hospital have responsibility in regard to the work done therein, and definite rules should therefore be established which limit a physician to practice only that type of medicine or surgery for which he is qualified. These community hospitals may be wholly supported by private philanthropy, as mentioned above, or there may be need of aid from the taxes collected in the community. It is also possible that some communities, even with the aid of local taxes, may not be able to support a properly equipped hospital, in which case the community would have to appeal to the public funds of the state, and if the latter were not able to support a sufficient number of community hospitals to serve its population it would be necessary to appeal to the federal government for aid. If it were necessary to appeal to the federal government for funds for any community it would be much more economical for the government to respond to such appeals individually than for it to set up an elaborate bureau to provide funds in general for the support of community hospitals.

#### INSURANCE FOR HOSPITAL BILLS

The second point in the program consists in the development of voluntary non-profit insurance plans to provide for the payment of hospital bills. The average cost throughout the country for this type of insurance, which usually covers three weeks of hospitalization, is about ten dollars a year for semi-private accommodations, and now an even cheaper rate is being developed for ward service. Such plans have developed on a tremendous scale in recent years, and the evidence shows that no non-profit voluntary plan organized on sound actuarial lines has failed since this movement started. Unfortunately, along with these suc-

insurance plans, others based on less sound lines have sprung up which have not been successful, and which have threatened bringing this type of insurance into disrepute among careless thinkers. An example of the debt the public for such plans is the growth of the Associated Hospital Service Corporation of Massachusetts, popularly known as the Blue Cross Corporation started out to insure only groups of employed people. The first policy was sold in 1937, and it was hoped that by the end of the year there might be 20,000 subscribers. At the end of the year and six months there were over 160,000 subscribers! Already this type of insurance has been made available to more people than were originally planned for, and it is hoped that as it goes on this type of insurance will be available for all the people.

#### INSURANCE FOR PHYSICIANS' BILLS

A third point in the program consists in the development of various non-profit plans of an insurance or contract nature to pay the physician's bill, so that the individual may remain the patient of his family physician and meet the expense of specialism when necessary. There are many such plans in operation throughout the country, but not as yet many of a voluntary non-profit variety, the latter is in part due to the difficulty in securing proper statistics upon which to base actuarial tables. Another serious difficulty in the development of such plans has been the conservatism on the part of the medical profession in approving specific insurance plans proposed by interested individuals, especially if these suggest group or contract practice. There seems to be a fear on the part of organized medicine that contracts will lead to deterioration in medical service. The unpleasantness in the District of Columbia, which has resulted in the federal government suing organized medicine, apparently originated in the hostility of organized medicine to a contract arrangement for the payment of doctors' care for a group of individuals. That some type of contract or group medicine may lead to a deterioration of medical service must be admitted, but organized medicine must realize that, in some instances, medical care may actually be better on a contract basis. The medical officers in the United States Army and the United States Public Health Service are on a contract basis, and the work of these physicians needs no criticism. Many industrial firms take excellent care of their employees by employing physicians on a contract basis, and many American colleges have contract physicians to care for their students with results far superior to those of former times. The actual facts

are that some work may be done better on a contract basis and that in other instances the stimulation of the fee system produces better results. There is room for both methods of paying for medical service in this large country of ours.

In a discussion of any insurance or contract plan for paying physicians' bills one almost always hears the question, Does this permit the free choice of physician? Just when and how this expression arose in discussion of economic problems in medicine it is hard to say, but it probably originated with the development of compulsory insurance acts, such as those which cover industrial and automobile accidents in this country or of governmental insurance plans in other countries. With the former the private insurance companies involved in this work often tried to have the patients cared for only by the company doctors. The medical profession quite properly objected to this and succeeded in making it possible for an individual treated under these compulsory forms of insurance to have the physician of his choice. The threat that "free choice of physician" is eliminated in voluntary insurance and voluntary contract plans for the payment of physicians' bills is frequently used by objectors to these plans, but I insist improperly so. For if an individual voluntarily joins a plan for medical service in which it is known who the physicians are, it would seem that the individual is choosing those physicians just as freely as he chooses his physicians when he goes to one of the large private clinics of this country, of which there are many. Therefore, the medical profession should not let this expression "free choice of physician" interfere with the development of plans for distributing the cost properly created by physicians' bills.

Just what the cost will be per individual for insurance against appropriate physicians' bills for this class of patients cannot yet be as accurately judged as the cost of insurance against hospital bills, but enough plans have been tried to make it evident that it can be obtained at a figure within the reach of the low-income group.

If this three-point program is developed, there will be available for all the people of the country properly equipped hospitals which will provide aids for diagnosis and treatment which are too expensive for individual physicians or groups of physicians to maintain. The expense of these hospitals will be borne by the community as a whole, with the funds collected as mentioned above. Some of the support of these hospitals will be provided by the charges to patients who enter the hospital, but these hospital charges for the individual will be paid by the non-profit in-

surance companies, so that this cost will not be a severe financial burden on any one individual. Finally the physicians' bills will be paid by some non-profit insurance company or provided for on a contract basis so the individual will not have to meet any unusually high cost. By this program, therefore, the individual in the low-income group can remain the private patient of his own

physician for the great majority of illnesses. Let us hope that by the development of such programs the individuals in the low-income group will be satisfied with their medical care, so that complaints from this large percentage of the population will not stimulate the politicians into governmental action aimed toward the establishment of compulsory health insurance.

## THE ASSAY OF CRYSTALLINE AND URINARY ANDROGENS\*

With Special Reference to Their Measurement by a Colorimetric Method

HARRY B. FRIEDGOOD, M.D.,† AND HELEN L. WHIDDEN, M.A.

BOSTON

**R**ECENT advances in the physiology and biochemistry of the secretions of endocrine glands have made it possible to begin a study of certain phases of the complex problem of hirsutism in women. The importance of discovering the etiologic factors responsible for this condition and the measures necessary for its alleviation can be judged only in terms of the disfiguring nature of the affliction, the serious emotional disturbances which it initiates and the clinical disorders with which it is commonly associated.

The most recent advances in the study of hirsutism and virilism are being made along biochemical lines. Because of the obvious association between the biologic activity of male sex hormones and the physical characteristics of hirsutism and virilism, attention has been directed in such patients to the extraction and quantitative determination of urinary and blood constituents possessing the biological action of male hormones. Before studies of this type were undertaken, it had been determined that androgens are excreted normally in the urine of both men and women.<sup>1-3</sup> The total androgenic activity of normal male urine was found to be somewhat higher than that of normal female urine, although in many cases there was no obvious quantitative distinction.<sup>1-3</sup> The chemical nature of the androgens in normal female urine is still unknown except for traces of dehydroisoandrosterone (Callow<sup>4</sup>). In the urine of normal men the biological activity was traced in part to androsterone and dehydroisoandrosterone, which are present in approximately equal amounts.<sup>4-6</sup> Epi-etiucholanediol, a biologically inactive androgenic substance,<sup>7</sup> has also been isolated from the

urine of normal men. Since these do not account for the entire androgenic activity of normal male urine, there must be other androgens which still remain to be identified.

Chemical methods for the extraction of urinary androgens have been perfected to a more satisfactory degree than have those for the recovery of androgens circulating in the blood.<sup>8</sup> The former method, therefore, has been used almost exclusively in the expectation that the level of excretion in the urine of substances with male sex hormone activity might give some indication of the nature of the pathologic physiology of the endocrine glands in hirsutism and virilism. However, quantitative determination of the biological activity of substances excreted in the urine is at present an unreliable method for estimating hormonal activity in the body. Justification for the use of such urinary assays as an index of the physiologic activity of certain endocrine glands necessitates assumptions for the support of which there is no reliable evidence at present. One must assume, for instance, that the total biological activity of the urinary androgens is either equal to or quantitatively proportional to the biological activity of the tissue androgens. As a matter of fact, the androgens which have been identified in urine are not identical in chemical structure with those extracted from endocrine tissues, although they are similar to them. Adrenosterone<sup>9</sup> and testosterone<sup>10</sup> have been extracted only from endocrine tissues, the former from adrenal cortex, the latter from testis. Androsterone,<sup>11</sup> dehydroisoandrosterone<sup>12</sup> and epi-etiucholanediol,<sup>7</sup> on the other hand, have been recovered only from urine extracts. It is not known precisely how these two groups of androgens are related physiologically to each other. Even were this relation well established, the bioassay of urinary androgens, as employed at present, could at best give only a crude idea of the

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The problem is complicated still further by the fact that less than 5 per cent of androgens administered by injection can be detected in the urine by bioassay.<sup>4, 13, 14</sup> Is this due to the method of their extraction which as yet is not fully developed, or is the hormone so altered during its activity in the body and its preparation for excretion that it becomes unrecognizable even as a degradation product in the urine? It is known, of course, that sex hormones may be secreted in one form (for example progesterone) and excreted in another (sodium pregnanediol glycuronide).<sup>15</sup> This possibility must be taken into consideration, therefore, in connection with the apparent discrepancy between the intake and output of androgenic substances.

As might be expected from this survey of the problem, the results of urinary bioassays in hirsutism and virilism have added but little to our understanding of these conditions except in those patients whose virilism is due to an adrenocortical tumor. The total urinary androgens in hirsutism or virilism (not due to adrenal tumors) are either within normal limits or only moderately elevated.<sup>4, 16, 17</sup> The total urinary androgens in patients with virilism due to adrenocortical tumors, however, are unusually high and, therefore, of distinct diagnostic importance.<sup>4, 18</sup> In 1 such case Callow traced 70 per cent of this androgenic activity to dehydroisoandrosterone.<sup>19</sup> In cases of adrenal hyperplasia, Butler and Marrian isolated isoandrosterone and pregnane-3,17,20-triol from the urine.<sup>20, 21</sup> This may be significant because these androgens have not been found in the urine of normal people. In spite of the difficulties which have been pointed out, it is studies such as these, in addition to those of normal people which necessarily preceded them, which have given us a point of departure from which to extend further investigations more advantageously.

Aside from the fact that at present one cannot make use of the urinary androgens as an index to the biological activity of the tissue hormones, the usefulness of this method is impaired still further by other considerations. The results obtained by bioassay, as it is now being practiced, are de-

pendent in large measure on variables which significantly affect their quantitative accuracy and which at present are not strictly controllable. In support of this contention one may cite the following:

(1) The capon method of bioassay has no sharply defined end point, because a capon unit is ordinarily defined in terms of an average increase in comb growth in a limited number of caponized birds. Because of inherent biological differences, particularly in capons not belonging to a highly inbred strain, the dosage response relation varies considerably in individual animals. As the number of animals used in a test is limited, only three to five birds being employed for most assays, there is a distinct possibility of introducing significant errors in such determinations. Recognizing this difficulty, Koch<sup>12</sup> advocates the use of more capons per test.

(2) The results of capon assays vary considerably even if the technic is fundamentally the same. In the hands of various investigators the capon unit has been assigned values ranging from 100 to 200% crystalline androsterone.<sup>22-28</sup> Moreover, if the method of hormone administration is changed from intramuscular injections to the application of androgens directly to the capons' comb by inunction, the biological effect of the androgen may be enhanced by more than fifty times.<sup>27-30</sup>

(3) Furthermore, the order of activity of various androgens likewise depends on their method of administration. With the intramuscular technic testosterone is six times as active and dehydroisoandrosterone one third as active as androsterone,<sup>12</sup> but testosterone and androsterone are similar in activity when given by inunction.<sup>28</sup>

(4) The nature of the solvent in which the hormone is administered may alter radically the biological effect of a given androgen. In the comb-growth method and in the castrate rat assay the use of alcohol as a solvent for androsterone enhances its activity twofold as compared with oil.<sup>28, 31</sup>

(5) Finally, if the castrated rat is used for bioassay, the presence of certain substances, some of which are unknown, greatly increases the androgenic activity of hormones or hormone-like chemical substances. David and Freud and their collaborators<sup>32, 33</sup> have isolated from the testis what they have termed an X substance which greatly activates androgens such as testosterone, when the latter is tested on the accessory sex organs of the castrated rat. It has been demonstrated also that certain of the higher fatty acids, notably palmitic acid, possess this property of activating androgens.<sup>34</sup>

One may conclude from this brief critique that the bioassay of the *total* androgen content of urine has only a limited usefulness in clinical medicine. So far as is now known, the total urinary androgen is elevated significantly only in cases of virilism due to adrenal tumor. The results of bioassay may be more significant when all the urinary androgens are isolated and identified, and the nature of their physiologic and biochemical relation to the tissue androgens is established. No one knows as yet whether the relative proportions in which various urinary androgens are excreted are significant in health and disease. For clinical purposes, there-

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The most recent advances in the study of hirsutism and virilism are being made along biochemical lines. Because of the obvious association between the biologic activity of male sex hormones and the physical characteristics of hirsutism and virilism, attention has been directed in such patients to the extraction and quantitative determination of urinary and blood constituents possessing the biological action of male hormones. Before studies of this type were undertaken, it had been determined that androgens are excreted normally in the urine of both men and women.<sup>1-3</sup> The total androgenic activity of normal male urine was found to be somewhat higher than that of normal female urine, although in many cases there was no obvious quantitative distinction.<sup>1-3</sup> The chemical nature of the androgens in normal female urine is still unknown except for traces of dehydroisoandrosterone (Callow<sup>1</sup>). In the urine of normal men the biological activity was traced in part to androsterone and dehydroisoandrosterone, which are present in approximately equal amounts.<sup>4-6</sup> Epi-etiocholanediol, a biologically inactive androgenic substance,<sup>7</sup> has also been isolated from the

urine of normal men. Since these do not account for the entire androgenic activity of normal male urine, there must be other androgens which still remain to be identified.

Chemical methods for the extraction of urinary androgens have been perfected to a more satisfactory degree than have those for the recovery of androgens circulating in the blood.<sup>8</sup> The former method, therefore, has been used almost exclusively in the expectation that the level of excretion in the urine of substances with male sex hormone activity might give some indication of the nature of the pathologic physiology of the endocrine glands in hirsutism and virilism. However, quantitative determination of the biological activity of substances excreted in the urine is at present an unreliable method for estimating hormonal activity in the body. Justification for the use of such urinary assays as an index of the physiologic activity of certain endocrine glands necessitates assumptions for the support of which there is no reliable evidence at present. One must assume, for instance, that the total biological activity of the urinary androgens is either equal to or quantitatively proportional to the biological activity of the tissue androgens. As a matter of fact, the androgens which have been identified in urine are not identical in chemical structure with those extracted from endocrine tissues, although they are similar to them. Adrenosterone<sup>9</sup> and testosterone<sup>10</sup> have been extracted only from endocrine tissues, the former from adrenal cortex, the latter from testis. Androsterone,<sup>11</sup> dehydroisoandrosterone<sup>12</sup> and epi-etiocholanediol,<sup>7</sup> on the other hand, have been recovered only from urine extracts. It is not known precisely how these two groups of androgens are related physiologically to each other. Even were this relation well established, the bioassay of urinary androgens, as employed at present, could at best give only a crude idea of the

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†Instructor in medicine and research fellow in physiology, Harvard Medical School; junior associate in medicine, Peter Bent Brigham Hospital.

as acetoacetic acid, creatinine, estrogens and other phenols which might have a ketonic group, and which would therefore interfere with the accuracy of the results obtained by the chemical procedure.

Our patients were studied for from two to eight weeks, their urines were collected in twenty-four amounts three times a week and prepared for assay within twenty-four to forty-eight hours after collection. We have reported the results of assays in color units read directly from the instrument and have stated their equivalents in crystalline androsterone. The amount of the ketonic sterols in the neutral fraction of the urinary extracts can be estimated, therefore, in terms of crystalline androsterone. In this way the results of chemical assay are made comparable with those obtained by bioassay.

Although the detailed results of our clinical studies are being reported elsewhere, we wish to indicate here to what extent our chemical method of assay has been applied to the practical problems of clinical endocrinology. Extensive observations have been made on 3 normal women, 21 individuals with hirsutism and 2 patients with virilism due to adrenocortical tumors. The urines of the normal women were assayed three times a week for four weeks, those of the patients with hirsutism three times a week for four to eight weeks. The patients with adrenal tumors were studied at similar intervals for one month and twelve months, respectively. Normal young women excreted the equivalent of 4 to 15 mg of androsterone per twenty-four hours. As the series grows larger, we expect that the lower limit will decrease, the upper limit probably will not change appreciably. Patients with hirsutism excreted the equivalent of 1 to 29 mg of androsterone per twenty-four hours. Most of the results in this group fell within the normal range, relatively few excreted the equivalent of over 20 mg of androsterone per twenty-four hours. There seemed to be no fixed relation between the extent of hirsutism and the total androgen excretion. Mild cases of hirsutism do not ordinarily excrete large amounts of androgen, and extensive cases also may excrete relatively small quantities. The most remarkable excretion of androgens is encountered in patients with virilism resulting from adrenocortical tumors. In 2 such cases<sup>11</sup> we found the androgen excretion to be the equivalent of 45 and 325 mg of androsterone per twenty-four hours at various stages of the disease. The highest values appeared when the malignancy metastasized.

Callow, Callow and Emmens<sup>10</sup> have demonstrated that there is a statistically significant correlation between the results of bioassay and those

derived from the chemical test. Although Callow and her colleagues have employed a modification of Zimmermann's reaction which differs from ours, the results from both laboratories are essentially the same.<sup>10</sup> In their series normal women excreted <2.2 to 9.9 mg sterone per day, hirsute patients excreted <2.2 to 33 mg and patients with adrenal tumors excreted 150 to 175 mg. Their phrase "milligrams sterone" refers to the amount of color-producing ketonic substances in the urine and represents the chromogenic equivalent of crystalline androsterone.

Callow's studies and ours are also in substantial agreement on other points in the colorimetric assay of urinary androgens.

(1) As measured colorimetrically, the androgen excretion of normal and hirsute patients may vary considerably from day to day just as has been reported for the bioassay.

(2) The colorimetric determination of urinary androgens yields higher values than can be obtained by bioassay. This is not at all surprising, for several reasons. In the first place, urine probably contains biologically inactive ketonic sterols, which are chemically closely related to androsterone and dehydroisoandrosterone and behave similarly from a chemical viewpoint. In the second place, there may be non-androgenic substances in the urine, as yet unknown, which react like androsterone with metadinitrobenzene. If present at all, they are there in only relatively small quantities, judging from the results obtained from bioassay and colorimetric assay.

#### DISCUSSION

The chemical (colorimetric) method gives consistent results, and there is a significant correlation between these results and those obtained by bioassay. Because it incurs less expense and is less time-consuming the chemical method is probably superior for clinical use to that of bioassay. It is apparent from our own data and that of Callow's that the chemical method can be used more advantageously in the diagnosis of adrenocortical tumors in patients with virilism. We are in agreement with reports in the literature that there is an excessive daily excretion of androgen in cases where an adrenocortical tumor exists, and Callow has found that 70 per cent of this androgenic activity can be accounted for by dehydroisoandrosterone. The remarkably high values for urinary androgens thus far seem to constitute an important differential point between the benign type of hirsutism and that caused by a neoplasm. It remains for further investigation to determine whether these strikingly elevated values for the urinary androgens are specifically characteristic

fore, it is advisable to substitute for the bioassay a less laborious and less expensive technic, which necessitates no greater assumptions than are already being made with the method of bioassay. Such a technic became possible following the establishment of the chemical structure of certain of the androgens and closely related steroids. This method of assay is based on a colorimetric reaction, which was applied to the quantitative estimation of crystalline and urinary androgens. We have proved to our own satisfaction that by means of it one may assay quantitatively crystalline androsterone and dehydroisoandrosterone, and that it is adaptable to the assay of urinary androgens.

The colorimetric method of assaying androgens was first described by Zimmermann<sup>35, 36</sup>. It was modified later by Wu and Chou,<sup>37</sup> Oesting,<sup>38, 39</sup> and Callow, Callow and Emmens.<sup>40</sup> This method of assay is based essentially upon a nonspecific chemical reaction in which substances containing a  $-CH_2CO$  group react in an alkaline alcoholic solution with metadinitrobenzene to produce characteristic colors. The shade and intensity of these colors depend on a number of variables, such as the temperature of the reaction, the duration of the reaction, the concentration and amount of the alkali, the concentration and amount of the metadinitrobenzene, the relative proportions of alcohol and water, and illumination.

Although Oesting<sup>38, 39</sup> develops his colors at room temperature, we have found, as have all other investigators,<sup>36, 37, 40</sup> that it is necessary to control all these factors rigidly. By modifying certain of the aforementioned variables, we increased the sensitivity of the reaction tenfold as compared with Oesting's modification, and succeeded in eliminating the development of interfering browns which affect the accuracy of the colorimetric determinations.

The procedure for color development according to our modification of the Zimmermann reaction for use in the Oesting colorimeter was applied to the assay of crystalline androsterone and dehydroisoandrosterone in the following manner:

Aliquot portions of an alcoholic hormone solution of known concentration are measured accurately into Oesting's colorimeter tubes, using a previously calibrated 1-cc pipette graduated in 0.01 cc. The alcohol is evaporated off carefully over a water bath at 70-75°C., and after cooling the tubes to room temperature, 0.15 cc. of 95 per cent ethyl alcohol, 0.2 cc. of 2 per cent metadinitrobenzene in absolute ethyl alcohol and 0.2 cc. of 15 per cent aqueous potassium hydroxide are added to each tube. Their contents are then mixed thoroughly. At the same time a control tube containing identical amounts of the two reagents and alcohol is prepared. The tubes are placed in the dark in a water bath maintained at precisely 25°C. and, with occasional shaking, are kept there for one and a quarter hours. The contents of the tubes are then diluted

to a volume of 7 cc. with 95 per cent ethyl alcohol. After being thoroughly mixed, they are assayed immediately in the Oesting colorimeter, which is set up with the necessary precautions to ensure optimal lighting conditions.

Using our modification of the Zimmermann reaction, we first calibrated Oesting's colorimeter with known quantities of crystalline androsterone and dehydroisoandrosterone. Oesting failed to take this precaution and relied wholly on capon assays of urinary androgens (unknowns) for the development of the color and the standardization of the disks in his colorimeter.<sup>38, 39</sup> As a result of our studies we reached the following conclusions:

(1) The intensity of the pink to-red color which develops is proportional to the amount of hormone present in solution.

(2) The disks of the Oesting colorimeter representing color units below 20 are unreliable for quantitative assays.

(3) When colors are developed by Oesting's method and assayed with his colorimeter, 1 color unit is equivalent to approximately 100  $\gamma$  crystalline androsterone, whereas originally he claimed that a color unit was equivalent to  $10 \pm 2$   $\gamma$  androsterone. According to our method 1 color unit is equivalent to 8.96 to 10.04  $\gamma$  crystalline androsterone, depending on the disk used for a given determination. Calibration of the instrument with crystalline androsterone has resulted in the following values for each of the disks:

DISK MARKING	AVERAGE AMOUNT ANDROSTERONE PER UNIT	ANDROSTERONE EQUIVALENT OF EACH DISK
20 units	8.96 $\gamma$	17.92 $\gamma$
28 units	9.04 $\gamma$	25.31 $\gamma$
34 units	9.84 $\gamma$	33.46 $\gamma$
40 units	10.04 $\gamma$	40.16 $\gamma$
50 units	9.63 $\gamma$	48.15 $\gamma$

(4) Crystalline dehydroisoandrosterone gives a more intense pink color per unit of weight than does crystalline androsterone. Quantitatively, it is less of a complicating factor than already exists in the marked differences which are characteristic of the biological activity of these hormones. Further data on this point are being reported in another communication.

Having calibrated each colored disk of Oesting's colorimeter in terms of  $\gamma$ -equivalent crystalline androsterone, we then applied our modification of Zimmermann's reaction to the assay of urinary androgens in normal and hirsute women in order to determine whether one could for purely clinical purposes substitute the chemical method for that of bioassay.

Extraction and purification of the androgenic substances were done by a modification of the method of Gallagher et al.<sup>17</sup> This process effectively separates androgens from substances such

as ketonic acid, creatinine, estrogens and other phenols which might have a ketonic group, and which would therefore interfere with the accuracy of the results obtained by the chemical procedure.

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## ENDOCRINOLOGY AS NOW PRACTICED\*

ROBERT T. FRANK, M.D.†

NEW YORK CITY

**T**ODAY every practitioner of medicine is forced and likes to practice endocrinology. I shall act as commentator of the current methods of treatment, and give you my own views, based on both clinical and laboratory experience. The most expeditious method of covering the subject will be to take up seriatim the symptoms produced by underfunction and overfunction of each gland, with short remarks on the treatments used, their effectiveness and limitations.

### ANTERIOR PITUITARY GLAND

**Underfunction** Before the adult stage has been reached, underfunction produces either the short, obese, Fröhlich type or the doll-like Levi-Lorraine syndrome, as well as the true pituitary dwarf. Anterior pituitary extracts have been used. No extract potent for the human being, either growth-promoting, maturizing or gonadotropic, is available. I have obtained no results by therapy in any of these groups. Many individuals develop into normal adults spontaneously. In the adult, Sim-

mond's disease is produced by failure of anterior pituitary function. Death alone clinches the diagnosis, and no treatment has proved effective. The majority of recoveries occur in cases in which the disease is simulated, usually those of anorexia nervosa. It is conceivable that minor grades of the disease may exist, producing an asthenia similar to that seen with failure of the adrenal cortex. In these cases, if no improvement is produced by a potent cortical extract, Simmond's disease must be suspected.

**Overfunction** Excessive growth is produced in the adolescent group. Giants in the adolescent group suffer because their school contacts are rendered difficult by their excessive size, which is disproportionate to their mental attainments. My efforts to control the rapidity of growth by large doses of androgens in girls and estrogens in the youths have shown no results. X-ray therapy to the pituitary gland, which has been advocated, is too dangerous for me to attempt it. In the adult group, acromegaly is a chronic disease when first seen, and has proved unresponsive to every form of treatment except surgical intervention to save eyesight.

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†Clinical professor of gynecology, Columbia University College of Physicians and Surgeons; consultant gynecologist, Mount Sinai Hospital, New York City.

of the virilism associated with adrenocortical tumors. We have not yet had the opportunity of making such studies in arrhenoblastoma of the ovary, and thus far neither we nor others have found values of this order in Cushing's syndrome without an adrenocortical tumor.

We have demonstrated, furthermore, that the colorimetric assay of urinary androgens may yield information of prognostic importance, because by means of it we were able to predict the post-operative recurrence of an adrenal tumor about four months before clinical evidence of metastasis was first apparent.<sup>41</sup>

It is also evident that little further can be gained in the investigation of the pathologic physiology of hirsutism and virilism by studying only the total daily androgen excretion. More rapid progress assuredly will be made after it becomes possible to isolate quantitatively and to identify chemically the various urinary androgens. Such investigations may disclose qualitative differences between the androgens of normal and hirsute women. Butler and Marrian<sup>20, 21</sup> have already isolated isoandrosterone and pregnane-3,17,20-triol from the urine of patients with virilism and adrenal hyperplasia, these androgens have not been found in the urine of normal women.

Kenyon et al.,<sup>17</sup> Gallagher et al.,<sup>3</sup> Glass and Bergman<sup>42</sup> and others, who have investigated the androgen-estrogen ratio in normal women and in those with hormonal disturbances, have reported interesting findings on this aspect of the problem. It is quite possible that a relative increase in androgen production, and consequently in excretion, may account for certain types of hypertrichosis. This seems a likely explanation for the hirsutism in one of our patients who developed hypertrichosis during a six-month period of amenorrhea which began at the time of a severe streptococcal infection. With the reappearance of the menses the growth of new hair stopped, but the hair already present remained unchanged.

#### SUMMARY

The quantitative determination of urinary androgens by bioassay has various limitations which curtail its usefulness in the study of the pathologic physiology of hirsutism and virilism and in its practical application to the problems of clinical medicine. For these and other reasons it is proposed to supplant the method of bioassay, for purely clinical purposes, by a chemical technique which necessitates no greater assumptions than are already being made by those who use the bioassay exclusively.

The chemical method of assay is based on a colorimetric reaction (Zimmermann's) by means

of which one may, with significant accuracy, quantitatively assay the crystalline androgens. This method also has been adapted satisfactorily to the assay of urinary androgens.

Oesting's colorimeter has been calibrated in terms of crystalline androsterone, and its limits of accuracy defined. It has been determined that Oesting's modification of Zimmermann's reaction is not adequately sensitive for quantitatively accurate assays. Our own modification of the Zimmermann reaction is about ten times as sensitive as that of Oesting.

The chemical method of assaying urinary androgens gives information of diagnostic and prognostic importance in certain cases of virilism. Preliminary studies have indicated that the androgen excretion for normal young women is the equivalent of 4 to 15 mg androsterone per twenty-four hours, and that patients with benign hirsutism and adrenogenital virilism excrete the equivalent of 1 to 29 mg androsterone per twenty-four hours. In 2 cases of virilism due to adrenocortical tumor the androgen excretion was found to be the equivalent of 45 and 325 mg androsterone per twenty-four hours at various stages of the disease. In 1 of these cases<sup>41</sup> the androgen excretion fell to normal levels immediately after the removal of the tumor, but began to increase again about four months before clinical evidence of recurrence was detected.

Assay of the total urinary androgen excretion, either by the chemical or the biological method, can give only a crude index to the physiology of the male sex hormones until it becomes possible to identify chemically and to assay quantitatively each of the urinary androgens and to establish the physiological relation of the glandular hormones to those excreted in the urine.

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## ENDOCRINOLOGY AS NOW PRACTICED\*

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**T**ODAY every practitioner of medicine is forced and likes to practice endocrinology. I shall act as commentator of the current methods of treatment, and give you my own views, based on both clinical and laboratory experience. The most expeditious method of covering the subject will be to take up seriatim the symptoms produced by underfunction and overfunction of each gland, with short remarks on the treatments used, their effectiveness and limitations.

### ANTERIOR PITUITARY GLAND

**Underfunction** Before the adult stage has been reached, underfunction produces either the short, obese, Fröhlich type or the doll-like Levi-Lorraine syndrome, as well as the true pituitary dwarf. Anterior pituitary extracts have been used. No extract potent for the human being, either growth-promoting, maturizing or gonadotropic, is available. I have obtained no results by therapy in any of these groups. Many individuals develop into normal adults spontaneously. In the adult, Sim-

mond's disease is produced by failure of anterior pituitary function. Death alone clinches the diagnosis, and no treatment has proved effective. The majority of recoveries occur in cases in which the disease is simulated, usually those of anorexia nervosa. It is conceivable that minor grades of the disease may exist, producing an asthenia similar to that seen with failure of the adrenal cortex. In these cases, if no improvement is produced by a potent cortical extract, Simmond's disease must be suspected.

**Overfunction** Excessive growth is produced in the adolescent group. Giants in the adolescent group suffer because their school contacts are rendered difficult by their excessive size, which is disproportionate to their mental attainments. My efforts to control the rapidity of growth by large doses of androgens in girls and estrogens in the youths have shown no results. X-ray therapy to the pituitary gland, which has been advocated, is too dangerous for me to attempt it. In the adult group, acromegaly is a chronic disease when first seen, and has proved unresponsive to every form of treatment except surgical intervention to save eyesight.

Presented at the New England Postgraduate Assembly, Cambridge, November 15, 1938.

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## POSTERIOR PITUITARY GLAND

Diabetes insipidus, characterized by excretion of 5 to 20 liters of urine per day, is due to a disturbance of the posterior pituitary lobe, sometimes caused by pressure on the hypothalamus. This condition is controlled by appropriate doses of posterior pituitary extract, given by hypodermic injection, under the tongue or intranasally. Intermedin shows no advantages over posterior pituitary extract.

## THYROID GLAND

Thyroid disturbances are sufficiently understood, and require little discussion.

*Underfunction* Cretins, if taken in hand sufficiently early, can be developed into fairly normal individuals. Adults with myxedema can be kept in normal health by desiccated thyroid gland or thyroxin. It must be remembered that the several thyroid preparations vary greatly in strength, and it is well to become acquainted with and stick to one preparation. Thyroid underfunction may produce many by-effects, such as amenorrhea, obesity or abortion. In adolescents, severe menorrhagia is sometimes noted.

*Overfunction* Endemic adolescent goiter no longer forms a public-health problem, thanks to Marine's iodine mass therapy. Patients with exophthalmic or toxic goiter, particularly those with a mild degree of the disease, respond to medical measures, particularly to a placid and protected form of life. For the present, at least, most cases remain largely surgical problems. The use of x ray for the treatment of this condition is risky, for the dose is almost impossible to gauge, and regression is apt to continue for a long time after the treatment has been stopped, with resultant underfunction.

## PARATHYROID GLAND

*Underfunction* If underfunction is acute, tetany is readily relieved by calcium, fluids and parathormone. Chronic tetany, oftenest seen as the result of surgical removal of the parathyroids, shows increasing tolerance to parathormone, and this makes effective relief difficult. Whether the dihydrotachysterol introduced by Holtz will permanently replace parathormone in these patients is as yet undetermined.

*Overfunction* Hyperparathyroidism is due to parathyroid adenoma and produces osteitis fibrosa cystica. It is believed that both scleroderma and osteomalacia are likewise due to parathyroid overfunction. Surgical intervention is indicated, with removal of the adenoma, and sometimes of parathyroid tissue where diffuse hyperplasia appears to exist.

## PANCREAS

*Underfunction* Pancreatic insufficiency causes diabetes mellitus. This disease has been robbed of much of its gravity by the discovery of insulin. I shall not venture to discuss the use of insulin here in the vicinity of Boston, but it should be appreciated that cases difficult to control require special knowledge.

*Overfunction* Hyperinsulinism, with its dramatic and often misleading train of symptoms,—particularly convulsions,—is due to adenoma of the islands of Langerhans. Surgical intervention is called for if the diagnosis is well established. At laparotomy the adenomas may not be discovered, and even at autopsy the multiple small nodules may be difficult to recognize.

## ADRENAL GLANDS

*Underfunction* Addison's disease, due in the vast majority of cases to tuberculosis of the adrenal cortex, proves fatal unless adequate amounts of potent cortical extract are administered. The commercial extracts vary in potency and appear to deteriorate, and are therefore rarely effective. Minor degrees of insufficiency most probably produce severe asthenia and loss in weight, the syndrome then resembling minor grades of Simmond's disease. Such patients should be benefited by a potent cortical extract.

*Overfunction* Overgrowth of the adrenal cortex produces the adrenocortical syndrome. The underlying condition may be carcinoma or hyperplasia. The resulting complex is marked by hirsutism, trunk obesity, polycythemia, high blood pressure, osteoporosis and colored striae. If visualization of the adrenals by means of perirenal insufflation of carbon dioxide shows enlargement, surgical removal of the tumor or resection of the hyperplasia is indicated. As the operation is difficult and dangerous, it is not yet advised for minor degrees of the syndrome.

Overfunction of the adrenal medullary produces extreme hypertension. If such a condition is diagnosed, surgical removal of the paraganglioma is indicated.

Hirsutism, particularly facial hirsutism in women, appears to be due to an adrenal disturbance. Large doses of estrogen have not produced any improvement. Bleaching of the hair and electrolysis appear at the moment to be the sole remedies for this very disturbing disfigurement.

## MALE GONADS

*Underfunction* In the adolescent group hypogonadism, because of the accompanying growth

disturbances, appears almost assuredly a primarily pituitary underfunction. These boys are usually tall and obese, and not infrequently show gynecomastia. The testes are very small, with correspondingly small phallus and prostate. The disturbance is usually noted about the tenth or twelfth year. Often but not invariably cryptorchidism is present. No operative intervention for the latter should be undertaken until at least a year's treatment with the gonadotropic factor, obtained from pregnancy urine, has been tried. This factor, however, does not relieve hypogonadism. The great majority of these adolescents eventually become normal by the nineteenth or twenty-first year. Less than 5 per cent are permanently handicapped. Pituitary glandular extracts are of no avail. If the thyroid function is insufficient, thyroid extract may be given. Androgens are not indicated. Adult hypogonadism cannot be cured. Libido may be temporarily awakened by adequate dosage of androgens in both hypogonad individuals and castrates. At least 25 mg of testosterone, given two or three times a week, is required. No permanent good is achieved by this therapy, and the effect is undoubtedly psychic. Spermatogenesis is not stimulated.

*Overfunction* In adolescent males hypergonadism is a very rare syndrome. I have seen it as early as the sixth year, with full hirsutism, large phallus, strong sex urge and disturbed or defective mentality. These individuals are liable to be arrested for sex delinquencies or crimes. The underlying cause appears to be adrenal hyperfunction. If an enlargement of the adrenal is diagnosable, surgery is indicated, and even if not demonstrated, exploration is justified. The attempt to produce reduction of prostatic hypertrophy with androgens does not rest on a sound basis, and the effects reported are not convincing.

#### FEMALE GOVADS

*Underfunction* Such a condition is not recognizable until the normal time of pubescence. As in the male, the build is usually abnormal, either infantile or eunuchoid. The secondary sex characteristics do not develop. Menstruation does not appear. As the time of menarche is very variable, too early efforts at treatment are to be avoided. This condition is primarily due to prepituitary underfunction. It cannot be influenced by direct measures. The gonadotropic extracts derived from pregnancy urine do not help. Thyroid underfunction demands thyroid extract. Estrogens are of no use. Obesity or malnutrition, both frequent causes, should be corrected by adequate hygienic and dietary measures.

In adults, both primary and secondary amenorrheas, unless due to thyroid insufficiency, obesity, malnutrition or some severe intercurrent constitutional disease, such as tuberculosis, are unresponsive to any form of treatment, the condition almost surely being due to primary prepituitary insufficiency. Huge doses of estrogen (1,500,000 international units) are required to produce a single menstruation, a result which is of little benefit to the patient. Frequently without known cause, menstruation and fertility return after many years of amenorrhea. Likewise conception during a long period of amenorrhea is sufficiently frequent to require mention. Small doses of x-ray to the ovarian regions have restored menstruation and fertility, but in my opinion more cases have been rendered permanently amenorrheic and sterile by this form of therapy\*. Recently, intravenous injection of pregnant mare's serum has produced ovulation and has been followed by pregnancy. The potential dangers inherent in this method of treatment limit its application to very expert hands.

The menopause (both physiologic and that induced by x-ray therapy or by surgical castration) is the most extreme form of underfunction. All its symptoms,—mental, neurovascular, arthritic and digestive,—as well as local atrophies, are relieved by adequate dosage of estrogens. The therapy must be continued at intervals for a long time. Estrogens are specific for the relief of the symptoms of the menopause.

*Overfunction* Hypersecretion of the ovaries is due to prepituitary overfunction. In the majority of cases, menorrhagia and metrorrhagia are the predominant symptoms. It is necessary to exclude anatomic causes for the bleeding, such as cervical lesions, carcinoma and fibroids. Hyperplasia of the endometrium and, if the condition exists for a long time, of the uterine muscle results. In my hands the gonadotropic factors, estrogens as well as androgens, have proved ineffective. Just as in all the other hyperfunctional conditions, surgery is indicated. As a rule, curettage in older patients, followed by intrauterine radium or by x-ray therapy applied to the ovaries, must be resorted to. In the adolescent group, as previously mentioned, 20 per cent show marked hypothyroidism with basal metabolic rates as low as -35 per cent. Thyroid therapy cures these cases. Where the thyroid function is normal, subcutaneous injection of moccasin venom has proved effective, although relapses are frequent, requiring resumption of the treatment.

\* This type of rad therapy requires a carefully graduated dosage. If it is to be employed it must be limited to fully qualified specialists.

\* \* \*

At present the vast majority of overfunctions of any of the glands of internal secretion warrant surgery if the diagnosis can be made. However, in my experience at least 50 per cent of the patients sent to me as having endocrine disease have been found to be suffering from non-endocrine conditions. I therefore emphasize that the search for non-endocrine causes must not be neglected. Only if such causes cannot be found should an endocrine origin be suspected.

In spite of the huge number of so-called endocrine products available, comparatively few are

actually potent. The use of anterior pituitary powder and of mammary, placental, splenic, thymic, pineal and orchitic extracts, foisted on the profession by alluring clinical reports, and reappearing in even more attractive form in some of the pharmaceutical literature, are entirely unjustified. On the other hand, no one can doubt the physiological and clinical value of thyroid extracts, parathormone, estrogens, androgens and potent adrenocortical extract. Their effects on properly selected cases are too specific and indubitable to be overlooked or misinterpreted.

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## UNILATERAL RENAL DISEASE WITH ARTERIAL HYPERTENSION\*

### Report of a Case Apparently Cured Following Nephrectomy

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**I**N VIEW of the rapidly increasing interest in the association of unilateral renal disease with long-continued arterial hypertension, we report in detail the history of a patient with this interesting combination of circumstances.

L F F, a 10-year-old, white, American girl, entered the Urological Service of the Massachusetts General Hospital through the Emergency Ward on March 16, 1937, complaining of right midabdominal pain of 1 week's duration. The onset was sudden, the pain was steady, dull and non-radiating, and was located below and to the right of the umbilicus. There was no accompanying nausea, anorexia or urinary or bowel symptoms. About 48 hours later an exacerbation of this pain 'doubled her up'. There was still no nausea or vomiting, and the bowels moved after a cathartic. Next day the patient felt much better. Three days before entering the hospital there was another exacerbation of pain, intensified on leaning forward. Subsequent to this an ice bag was applied to the abdomen and a cathartic, followed by an enema, was given.

The patient was said to have had pyelitis 3 years previously, about 2 months previously she had had an attack of burning on urination, but this was apparently of brief duration. She had always been constipated, under-sized and undernourished. The family history was irrelevant except that the mother at the time of the patient's entry was ill with pleurisy.

Examination showed a well-developed but undernourished, sallow child, lying in bed in no apparent distress. The throat was moderately injected, the teeth neglected. The heart and lungs were negative. Abdominal examination showed tenderness and spasm localized over a small area to the right of and below the umbilicus. There was so much muscular spasm that it was difficult to palpate

the region of the right kidney. There was no costo-vertebral tenderness, and no organs or masses could be felt. Peristalsis was normal, there was no psoas spasm, rectal examination was negative. The blood pressure was 185/130, the temperature 99°F, and the pulse and respirations were

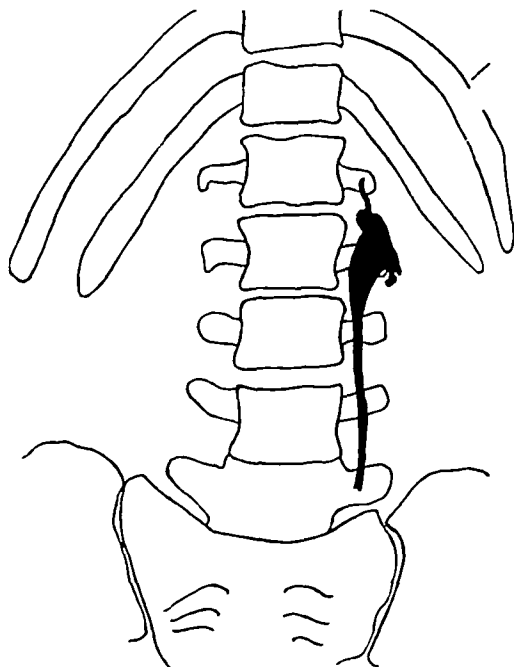


FIGURE 1 Tracing of Right Retrograde Pyeloureterogram

normal. On admission the urine was acid, there was a very slight trace of albumin but no bile, sugar, acetone or diacetic acid. The sediment showed 10 to 20 white cells per high power field. Subsequent urinalyses showed the same findings.

Blood studies showed 4,710,000 red cells, a hemoglobin

From the Urological Department, Massachusetts General Hospital. Read at a meeting of the New England Surgical Society, Boston, September 20, 1938.

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of 70 per cent and from 9500 to 12,500 white cells, the differential was normal. The nonprotein nitrogen was 20 mg per 100 cc., the phenolsulfonephthalein excretion was 61 per cent in 2 hours. A blood Hinton test was negative, as was a von Pirquet test. The stool was negative to guaiac.

Roentgenograms of the urinary tract showed the left kidney to be normal in size and position, the right kidney could not be visualized, perhaps because of gas and fecal matter in the colon. An intravenous pyelogram showed good excretion of the dye on the left with a normal pelvis calices and ureter, no dye was excreted by the right kidney. The findings were regarded as indicative of a non functioning right kidney. Plates of the chest were essentially negative.

Cystoscopic examination showed normal bladder and ureters. Catheters were passed without difficulty to either kidney. No urine whatever was obtained from the right; that on the left showed no leukocytes. The bladder urine showed 1 to 3 leukocytes per high-power field. A culture of the bladder urine was sterile on one occasion and later showed *Bacillus coli*, the left kidney urine was sterile. A right retrograde pyelogram was done, about 3 cc. of Skodan being injected. This showed poor filling of the minor calices; the pelvis did not appear to be dilated. (Fig. 1)

Subsequently the patient was seen in consultation by various members of the Pediatric Service. It was the consensus of all that we were dealing with an atrophic, functionless and probably infected right kidney. This, together with the fact that several blood-pressure readings showed persistent hypertension, the figures varying from 185/130 to 200/170, led to the opinion that the case was probably one of hypertension resulting from unilateral renal disease and that nephrectomy was indicated.

At operation on March 31 (by J. D. B.), an oblique incision was made in the right loin. A kidney about one quarter normal size was found lying in a normal position. It was quite firm and fibrous, and not adherent. There were no abnormal vessels noted, and the pelvis and ureter looked normal. The kidney was removed without incident. A drain was placed in the depths of the wound, which was then closed around it in layers.

The pathological report gave a diagnosis of healed pyelonephritis with renal atrophy, and was as follows:

Gross examination shows a kidney measuring 5 by 2 by 1 cm. The surface is smooth pinkish gray and glistening. On section the kidney substance measures 1 mm. in thickness and is soft. The pelvis is dilated. The mucosa is grayish smooth and glistening. The ureter measures 4 cm. in length and is slightly injected but otherwise negative.

The vessels appear normal but quite small. Immediately beneath the epithelium in one calyx is an extensive infiltration of lymphocytes, mononuclears, and occasional eosinophils. Other scattered foci of lymphocytic infiltration are found throughout the organ. Some times there is follicle formation. No abscesses are present. The parenchyma shows extensive atrophy, with sclerosis of many glomeruli and marked tubular atrophy. Throughout the kidney marked vascular changes are present, consisting chiefly of intense thickening in the smaller arteries and arterioles. This is most marked in the areas of parenchymal atrophy but is not limited to them. The cause of the renal atrophy cannot be determined with certainty, but the picture is consistent with a burned-out pyelonephritis. (Fig. 2)

Convalescence from operation was brief and uneventful. Twenty four hours later the blood pressure had dropped to 110/70, at about which point it remained until she was discharged. While in the hospital after operation, a few pus cells were found in the urine and a culture showed *B. coli*. After the patient was put on an acid-ash diet and



FIGURE 2. Photograph of Kidney Cortex

mandelic acid the urine became pus-free and sterile, and has remained so ever since.

During the 21 months since operation the patient has been seen at frequent intervals and the blood pressure has been checked. The systolic pressure has been a little over 100, but the last reading, taken on December 7, 1938, was 98/60.

From the time of Bright<sup>1</sup> it has been realized that certain forms of cardiovascular disease in man cause pathologic changes in the kidney and that hypertension may be the result of diffuse vascular disease with kidney involvement. Fahr<sup>2</sup> regards hypertension as a compensatory phenomenon to offset the reduced blood flow through the diseased kidney. Volhard and Suter,<sup>3</sup> however, believe that there is a humoral mechanism of renal origin as a cause of hypertension. From a review of the literature it seems obvious that even those who regard certain cases of hypertension as of renal origin cannot explain its mechanism.

Various experimental procedures, all aimed at producing an elevation of blood pressure, have been carried out in animals. These have given

varied but not constant results Goldblatt<sup>4</sup> and his co-workers have done what is perhaps the most convincing work in this direction. By partial occlusion of the renal arteries with a silver clamp they were able to produce a renal ischemia accompanied by hypertension. Their experiments indicate that at least experimental hypertension is due primarily to a humoral and not to a nervous mechanism. While the exact nature of the effective humoral substance has not yet been determined, it seems probable that it works in conjunction with the adrenocortical hormone in the production of hypertension in man.

In connection with the case which we have reported, it is interesting, perhaps valuable, to review the cases of unilateral renal disease occurring on the Urological Service at the Massachusetts General Hospital. Beginning with 1911 we have reviewed to date the records of all such cases with a diagnosis of pyonephrosis, pyelonephritis, hydronephrosis or pyelitis. There was a total of 305, of which 224 were nephrectomized. Women outnumbered men, 171 to 134. Seventy-six cases, or 25 per cent, had hypertension—a preoperative systolic blood pressure of at least 140 mm of mercury. Since Cabot<sup>5</sup> regards 110 to 135 mm as the normal range of systolic blood pressure, we have arbitrarily taken pressures of 140 mm or higher as evidence of hypertension but realize that this figure may be questioned.

It is obvious that an investigation of this kind in order to be of value should include a complete follow-up. Unfortunately for our present purpose, the importance and value of taking postnephrectomy blood-pressure readings have but just been

realized, and although many of the patients, whether or not operated on, were seen in the clinic at varying times after leaving the hospital, the blood pressures were taken in but 15 cases.

Of these patients, all of whom were nephrectomized and seen from four months to nine years after operation, 10, or 67 per cent, showed an average drop in systolic pressure of 30 mm, as compared with the preoperative level.

#### COMMENT

We consider the case reported to be an unusual example of unilateral renal disease, associated with and probably causing hypertension, and cured for twenty-one months by nephrectomy. There are few if any similar cases which have been closely observed for this length of time after operation.

We do not wish to put undue stress on the investigation of the cases from the Urological Service. It seems to us, however, that it indicates the importance of carefully studying and following up cases of unilateral renal disease, especially from the point of view of hypertension, both before and after operation. This procedure may result in the discovery that so-called renal hypertension is commoner than we have supposed.

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# REPORT ON MEDICAL PROGRESS

## DIAGNOSTIC ROENTGENOLOGY

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ROENTGENOLOGY is a field which is so intimately connected with most other specialties that advances in any of the latter naturally stimulate progress in the former, and conversely, developments in roentgenology favorably influence the other specialties. Progress in diagnostic roentgenology is commonly due to the introduction of new methods, but a different use of established types of examination often produces essential diagnostic improvements. Slight changes in the appearance of a roentgenological picture, recognized for many years and thought to be unimportant, after intensive study directed to this particular point, at times prove to be the only visible sign of an important pathologic lesion. On the other hand, small variations may have been overlooked for decades before being described. Examples of advances due to changes both in method and in interpretation present themselves in the review of recent progress in diagnostic roentgenology.

### HEART

For many years it has been a dream of roentgenologists and cardiologists to be able to see not only the comparatively undifferentiated shadow of the outside of the heart but also the shadow cast by the heart chambers themselves. In recent years, roentgenological studies of intracardiac calcifications (calcified valves, calcified annulus fibrosus, and so forth) and their movements have shown how complicated the physiology of the interior of the heart is and how little we know about it (Sosman and Wosika<sup>1</sup>).

These investigations only increased the hope that a method of exploration of this roentgenological *terra incognita* might be found. After unsuccessful attempts by many authors, Robb and Steinberg<sup>2</sup> in 1938 succeeded in obtaining pictures of the inside of the hearts of living men. By rapidly injecting approximately 35 cc. of 70 per cent Diodrast — the non-radioactive organic iodine compound which is routinely used in weaker concentration for intravenous pyelography — into the cubital vein, they obtained radiographic pictures of the following structures: the superior vena cava and its tributaries, all four heart chambers, the ventricular walls, the interventricular septum, the

tricuspid, pulmonic and aortic valves, the pulmonic and aortic sinuses, the pulmonary arteries and the thoracic aorta. The flow of the dye was so rapid that not all these structures were seen simultaneously, and preceding tests (ether test, cyanide test) were necessary in order to determine the optimal moment of radiographic exposure for a certain structure in a given patient.

The experience of these authors suggests that the method is not dangerous. It is not yet possible to obtain consistently a picture of any part of the cardiopulmonary circulation desired and failures are to be expected. In principle, however, the method has solved the above-mentioned problems, though improvements are necessary and are to be hoped for. The value of this method for the study of the physiology and pathology of the chest is obvious. Its prospects of becoming important in clinical medicine are excellent.

It will be helpful in many ways, such as in the differentiation of rheumatic and congenital heart lesions, in the differential diagnosis of mediastinal tumors and aneurysms, in the study of venous flow in constrictive pericarditis and in the determination of locus and cause of obstruction in upper mediastinal syndrome.

### PULMONARY DISEASES

Considerable progress has taken place in recent years in the roentgen examination of pulmonary diseases. This progress is characterized by the recognition of the role which mechanical factors play in roentgenological changes. Instead of describing "shadows," roentgenologists have become interested in the mechanical factors causing them, in other words, the parenchymal changes are studied as secondary to those in the bronchi and vessels. Obstructing lesions of the bronchi may produce atelectasis or, by a ball-valve mechanism in less complete cases, localized emphysema of the involved lung segment. Changes in the position of the diaphragm and mediastinum, as well as variations in the size and position of the hilar shadows, commonly occur. Secondary pneumonic and purulent processes with bronchiectasis and cavity formation may take place in the atelectatic areas.

Of course, not all pathologic changes can be

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varied but not constant results Goldblatt<sup>4</sup> and his co-workers have done what is perhaps the most convincing work in this direction. By partial occlusion of the renal arteries with a silver clamp they were able to produce a renal ischemia accompanied by hypertension. Their experiments indicate that at least experimental hypertension is due primarily to a humoral and not to a nervous mechanism. While the exact nature of the effective humoral substance has not yet been determined, it seems probable that it works in conjunction with the adrenocortical hormone in the production of hypertension in man.

In connection with the case which we have reported, it is interesting, perhaps valuable, to review the cases of unilateral renal disease occurring on the Urological Service at the Massachusetts General Hospital. Beginning with 1911 we have reviewed to date the records of all such cases with a diagnosis of pyonephrosis, pyelonephritis, hydro-nephrosis or pyelitis. There was a total of 305, of which 224 were nephrectomized. Women outnumbered men, 171 to 134. Seventy-six cases, or 25 per cent, had hypertension—a preoperative systolic blood pressure of at least 140 mm of mercury. Since Cabot<sup>5</sup> regards 110 to 135 mm as the normal range of systolic blood pressure, we have arbitrarily taken pressures of 140 mm or higher as evidence of hypertension but realize that this figure may be questioned.

It is obvious that an investigation of this kind in order to be of value should include a complete follow-up. Unfortunately for our present purpose, the importance and value of taking postnephrectomy blood-pressure readings have but just been

realized, and although many of the patients, whether or not operated on, were seen in the clinic at varying times after leaving the hospital, the blood pressures were taken in but 15 cases.

Of these patients, all of whom were nephrectomized and seen from four months to nine years after operation, 10, or 67 per cent, showed an average drop in systolic pressure of 30 mm, as compared with the preoperative level.

#### COMMENT

We consider the case reported to be an unusual example of unilateral renal disease, associated with and probably causing hypertension, and cured for twenty-one months by nephrectomy. There are few if any similar cases which have been closely observed for this length of time after operation.

We do not wish to put undue stress on the investigation of the cases from the Urological Service. It seems to us, however, that it indicates the importance of carefully studying and following up cases of unilateral renal disease, especially from the point of view of hypertension, both before and after operation. This procedure may result in the discovery that so-called renal hypertension is commoner than we have supposed.

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This technic has enabled the roentgenologist to show changes in some cases of gastritis. Above all, the roentgenological diagnosis of lesions of the gastrointestinal tract has been put on a more secure basis. The films obtained by this method represent the optimal fluoroscopic picture, so much so that they allow the study of the fluoroscopic image to continue without the patient's being present, and thereby make the diagnosis more certain in difficult cases. Except for color it is possible to obtain a picture of the inner surface of the gastrointestinal tract comparable to that which the pathologist sees when he looks at the opened specimen.

Ulcerated lesions which, owing to the changes in the vicinity of the ulcerations, are clearly malignant on inspection can be recognized as such roentgenologically. The differentiation of benign ulcers and those which grossly appear to be benign, but prove to be malignant histologically, still defies the efforts of any macroscopic type of examination, including roentgenology.

#### GALL BLADDER

Roentgenological examination of the gall bladder has a fair percentage of failures. Usually, the failure is due to the fact that small stones, due either to respiratory or pulsatory motion or to the small size of the stones compared with the density of the overlying dye, are not visible within a dye-filled gall bladder. Recent technical and methodical developments have tended to decrease the number of these errors.

One definite advancement has been the introduction of the examination of the dye-filled gall bladder in the upright position (Åkerlund,<sup>10</sup> Bernstein,<sup>11</sup> Ettinger<sup>12</sup>). Since most stones sink to the bottom of the gall bladder in this position, they are crowded in a small space at the fundus and are therefore more easily recognized than on films taken with the patient in the usual prone position, and overlying gas shadows can be more easily differentiated. The peculiar phenomenon of stones floating at a certain level in the dye has been described by these authors and has been confirmed by others. This examination is particularly valuable if done under fluoroscopic control.

A remarkable technical development is the construction of x-ray tubes with a rotating anode. In such a tube, the heat developing in the focal spot of the anode is distributed over a large area, and the use of a small effective focal spot together with a large load given in a fraction of a second is

possible. In the resulting films, excellent definition is present, and small biliary concretions are demonstrable with greater regularity than they have been heretofore.

#### SPINAL CANAL

It was a definite step forward when Camp<sup>13</sup> reported that slight pressure defects of the bony spinal canal produced by lesions, usually tumors, could be demonstrated. Unless the tumor was big, however, a diagnosis from the flat film was possible only when the tumor was localized in a favorable position. An examination following intradural injection of a contrast substance was therefore still necessary in many cases of intraspinal lesions. For this purpose Lipiodol remains the most reliable substance. The examination of small lesions of the spinal canal with this contrast medium has been markedly improved, with resulting discovery of characteristic pictures in posterior rupture of the intervertebral disks (Hampson and Robinson<sup>14</sup>). The fluoroscopic examination of the Lipiodol-filled spinal canal approaches that of the gastrointestinal canal in accuracy. But unless removed during operation, the Lipiodol remains indefinitely in the dural sac. In spite of this, the cases of permanent ill effects attributable to the presence of the oil are comparatively rare.

In a search for a more inert contrast substance, Young and Scott,<sup>15</sup> among others, have advocated the use of a gas. They were able to demonstrate even small ruptured disks after the introduction of air in the dural sac. Other examiners have not been so successful. It is advisable, however, to try an air examination of the spinal canal in cases of block before resorting to Lipiodol. The ideal contrast substance for the examination of the spinal canal has not yet been found, and therefore exact indications must be present before the present substances are employed.

#### ENCEPHALOGRAPHY AND VENTRICULOGRAPHY

In recent years the frequency with which air has been introduced into the cranial cavity for the study of non-neoplastic intracranial lesions has constantly increased, while there is a general tendency to decrease, if possible, the number of air injections in patients with questionable brain tumor. The intensive efforts of making a correct diagnosis and localization from the clinical findings, the electroencephalogram and a careful study of the flat films of the skull are, however, successful only in a comparatively small group of patients. In the large majority of cases an examination after intraventricular or intralumbar injection of air is still necessary. While no revolutionary changes

explained on this basis. But the stress laid by authors<sup>3-5</sup> in various countries on the study of these mechanically produced changes has resulted in the explanation of a number of patterns in the x-ray films of the lungs, the origin of which had not been known hitherto. For instance, horizontal lines in the lower lung fields were found to be due to small, plate-like areas of atelectasis (Fleischner<sup>4</sup>) again, so-called pictures of interlobar effusion were found to be produced by atelectasis (Hampton and King<sup>6</sup>).

This newer viewpoint made possible the recognition of the etiologic factor in cases of severe one-sided pulmonary disease, for example bronchial obstruction due to benign adenoma with secondary complete destruction of one lung. It decreased the number of lesions which had been erroneously called tuberculosis. More important, it led to the correct diagnosis in cases in which a small bronchial tumor or bronchial tuberculosis had produced bronchiostenosis with changes in the x-ray picture—variations which might readily escape the attention of an examiner unfamiliar with these studies. A slight displacement or a decrease in size of a hilar shadow, or a localized area of emphysema, for instance, might be the only abnormality visible in such a case. In addition these studies have decreased the number of so-called negative x-ray films in cases with hemoptysis.

The causes of bronchial obstruction are numerous: mucus, blood, foreign body, tumor, tuberculous and other inflammatory disease of the bronchial wall, pressure from outside by large lymph nodes, mediastinal tumor or aneurysm. The x-ray examination without contrast substance can often lead only to the diagnosis of bronchial obstruction and its location, whereas the etiology has to be established by clinical examination, bronchoscopy or lipiodol examination of the bronchi.

The progress in roentgenological examination of the chest is a characteristic example of the beneficiary effect of co-ordination of medical specialties. Advances in thoracic surgery have allowed operative control in many previously unsolved cases. They tremendously stimulated interest and therewith progress in thoracic roentgenology, the results of which in turn were used for the problems of thoracic surgery.

Hampton and Castleman<sup>6</sup> studied pulmonary embolism and infarction by comparing postmortem teleroentgenograms with the pathologic findings within lungs which had been distended by formalin to their normal size. They found that infarcts were more often visible on films than had been assumed. They were always subpleural, were particularly frequent in the lung edges and had

a characteristic roentgenologic appearance. Though the infarct usually decreased in size gradually and healed with scar formation, these authors have seen cases with rapid resolution of the x-ray shadow without necrosis or scar formation (in complete infarct). The incidence of embolism and infarcts in nonsurgical and in noncardiac cases without clinical evidence of phlebitis was striking. The roentgenological recognition of pulmonary embolism without infarction has been made only in exceptional cases in which extensive embolism was followed by thrombosis of the pulmonary arteries and the formation of a cor pulmonale. Usually such embolism is thought to produce no roentgenologic changes. It is therefore of great interest to note that Westermarck<sup>7</sup> described segmental pulmonary anemia, resulting in a narrowing of the lung vessels and localized increased brightness, as a sign of pulmonary embolism.

#### GASTROINTESTINAL TRACT

Within the last decade, roentgenology of the gastrointestinal tract has gone through a developmental stage which should be reported briefly, even though no unusual contribution has been made within the last year. This development, which started in various countries, and the main banner-bearers of which were Forssell<sup>8</sup> and Berg,<sup>9</sup> did not appear in this country until rather recently. It is characterized by the stress laid on the demonstration of the inner relief of the organs of the gastrointestinal tract. A barium coating is applied, thin enough to leave the elevations of the inner surface free while the valleys are filled. An x-ray examination at this stage of filling shows a picture of the relief of the whole inner surface of the organ, not only a shadow of its mass. In addition, a technical improvement has been developed which allows taking pictures during fluoroscopy, thus permitting the exact instantaneous fixation of a fluoroscopic image (so-called "spot" or aimed film).

This new orientation has led to the roentgenological demonstration of esophageal varices, and hence to the diagnoses of cirrhosis of the liver and of thromboses of the portal and splenic veins, and the differential diagnosis of splenomegaly has been markedly improved. The etiology of hematemesis has been established in many cases by the demonstration of varices. More commonly than before, small lesions, particularly tumors of the stomach and colon, are discovered roentgenologically and small ulcers in unusual positions are demonstrated. The high frequency and exactness with which the actual ulcer crater is demonstrated allow one to differentiate the ulceration itself and cicatricial

processes produced by the ulcer, and to decide, more frequently than before, whether or not an ulcer is active

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have taken place in the method or interpretation of cerebral air injection, the appearance of excellent summarizing reports on the normal encephalogram (Davidoff and Dyke<sup>16</sup>) and the pathologic ventriculogram (Lysholm et al<sup>17</sup>) is worth reporting

#### SOFT TISSUES

Roentgenology of the soft tissues is based on a fundamental principle. In respect to x-rays, air is less dense than fat, and fat less dense than the rest of the soft tissues of the body, all the latter being of comparatively equal density. The extensive distribution of fat in fascia and in other parts of the body produces enough contrast to give shadow pictures of muscles and internal organs. Carty<sup>18</sup> in particular emphasizes the importance of the resulting pictures. Edema produces a fairly characteristic pattern, the early recognition of which may be helpful in the diagnosis of inflammatory disease. This technic is of particular help in the diagnosis and differential diagnosis of soft-tissue tumors. The size, the shape and, when present, the capsule of a tumor can be visualized. Lipoma and hemangioma produce almost pathognomonic pictures, the former by the radiolucency of the tumor, the latter by its wormlike structure. The results obtained in the diagnosis of cancer of the breast from such an examination have, as a whole, been rather disappointing. On the other hand, soft-tissue films have become a routine procedure in the diagnosis and treatment of tumors of the pharynx and larynx.

In order to improve the results of the roentgenography of soft tissues, Gratz<sup>19</sup> recommended the intrafascial injection of air. Although this procedure may be of help in some cases, it is usually not necessary.

#### PLACENTA PREVIA

A few years ago, Ude and Urner<sup>20</sup> devised a roentgenological method of diagnosing placenta previa. They injected a small amount (25 to 40 cc) of a contrast substance, for example sodium iodide, into the bladder. The distance between the inner wall of the bladder and the presenting head of the fetus is normally not more than 1 cm, in placenta previa, however, it is greater. Recent reports from other authors<sup>21</sup> confirm these observations. The main value of the method seems to lie in the exclusion of placenta previa. Erroneous positive diagnoses may be due to blood clots or presenting soft tissues, but are said to be avoidable if the whole clinical picture is taken into careful consideration. Even though the fetal head and bladder may have a normal relation by x-ray examination, placenta previa may exist on the posterior wall of the uterus behind the head.<sup>22</sup> The results

of this type of examination have therefore to be accepted with reservation.

#### CONTRAST DEMONSTRATION OF LIVER AND SPLEEN

Ten years have passed since Radt<sup>23</sup> and Oka<sup>24</sup> discovered that colloidal thorium dioxide (Thorotrast), when injected intravenously, accumulated in the reticuloendothelial cells of the liver and spleen, thus allowing a roentgenological demonstration of these organs. The potential danger of the radioactivity of the injected substance immediately brought out protests against its use for diagnostic purposes. The time which has since elapsed allows us to evaluate better the arguments pro and con. There is no doubt that Thorotrast remains in the body almost indefinitely, for example, five years after injection 27 per cent of the substance has been found in the liver alone.<sup>25</sup> Several reports showed, though not absolutely convincingly, evidence of late damage, such as fibrosis in the liver, spleen and adjacent organs.<sup>26</sup> The radioactivity of the amount of Thorotrast used was shown to approach that of minimal doses of radium which have been proved to produce chronic radium poisoning. Nevertheless, other authors<sup>27</sup> have stressed the absence of any demonstrable injury in a group of cases observed over a period of several years.

On the whole, there remained enough doubt in the minds of most roentgenologists to prevent the indiscriminate use of this substance for the demonstration of the liver and spleen. Furthermore, with the passage of time there is now less necessity for such a contrast demonstration. Ordinarily, the outlines of the liver and spleen can be recognized on good flat films of the abdomen. Finally, the differential diagnosis of questionable tumors in the left upper abdomen, as well as the diagnosis of cirrhosis of the liver, has been greatly improved by the roentgenological demonstration of esophageal varices. However, a nontoxic dye permitting the visualization of healthy liver parenchyma should be of great practical value, particularly in the search for liver metastases. It is therefore of interest that Beckermann and Popken<sup>28</sup> have recently succeeded in visualizing the liver and spleen by the intravenous injection of colloidal organic iodine compounds. These substances are not radioactive and are apparently nontoxic. If the preliminary report is confirmed, a new field for routine roentgenological examination seems to be opened up.

#### KYMOGRAPHY AND BODY SECTION ROENTGENOGRAPHY

Among the roentgenological methods which have been introduced in recent years are two which require mention because they involve interesting technical procedures and because they have been widely discussed. They are kymography and body section roentgenography.

Kymography is a method which demonstrates different phases of the motion of an organ on a single film. In order to get such a picture, a grid with several narrow slits is placed between the patient and the cassette. By moving the cassette during a comparatively long exposure, a record of the motion of those parts of the organ seen through the slits is obtained. In other words, the type, speed, rate and extent of motion can be studied roentgenologically on a single film. Stumpf<sup>29</sup> deserves the main credit for the development of this method, which has been introduced in this country by Hirsch<sup>30</sup> and Scott and Moore<sup>31</sup>. The procedure has been extensively used for the study of the heart and vessels, to a lesser degree for that of the lungs, diaphragm and gastrointestinal organs. It has proved of interest in scientific research, but its clinical value has been thus far limited to a small number of cases, those, for instance, in which cardiac aneurysms could be demonstrated, or in which a differentiation of mediastinal tumor and an aneurysm was made possible. Kymography offers an excellent way of obtaining a permanent record of motion of an organ if needed for later comparative studies.

The aim of body section roentgenography, or planigraphy, is the roentgenological demonstration of a certain plane of a body by blurring every shadow produced by parts of the body above and below this plane. The blurring effect is obtained by moving the tube and film during the exposure in such a way that the resting-point of the axis of this movement lies in the desired plane. Its shadow is therefore well defined while everything else is erased by motion.

The principle of this method is relatively old. Recent applications have been reported under various names—laminagraphy, planigraphy, tomography, x-ray focussing device, and so forth. In this country Kieffer<sup>32</sup> and Moore<sup>33</sup> have emphasized the importance of the method. The isolated demonstration of a tissue disk of 5-mm thickness becomes possible. In the demonstration of areas difficult to examine, owing to dense overlying structures, for example the sternum or the sterno-clavicular joint, the value of this procedure is obvious. In the study of pulmonary disease (studies of cavities, bronchi and so forth) those who have used it praise it. Further use will show whether the method has general clinical value beyond the study of exceptional cases. The introduction of a simple planigraphic mechanism which can easily and without great expense be added to any Bucky table (Twining<sup>34</sup>) will probably popularize the method and allow its value to be judged on a broader base.

#### MOVING PICTURES AND PHOTOGRAPHY OF THE FLUOROSCOPIC SCREEN

A roentgenological record of the motion of the internal organs has been attempted for many years. More or less crude films were obtained by the use of revolving x-ray tubes and films (direct method) or by photography of the image on the fluoroscopic screen (indirect method). Recent improvements in fluoroscopic screens, photographic films and lenses have resulted in the production of roentgenological moving pictures of distinct value.<sup>35, 36</sup> Up to sixteen pictures can be taken per second, and even the fast-swallowing act has been recorded successfully. The teaching value of such a method is obvious. The same motion can be demonstrated to students again and again without endangering the patient. It is possible that diagnostic progress may also be obtained by this method.

The same improvements which allowed successful screen filming have made simple screen photography possible.<sup>37</sup> In other words, instead of using a large x-ray film one is able to photograph the screen image of a patient's chest on a small photographic film, and to study it directly or after magnification. Though such a method cannot be substituted for the routine methods of examination, its advantages in the examination of large groups of persons—soldiers, students, and so forth—are obvious.

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#### CONTRAST DEMONSTRATION OF LIVER AND SPLEEN

Ten years have passed since Radt<sup>23</sup> and Oka<sup>24</sup> discovered that colloidal thorium dioxide (Thorotrast), when injected intravenously, accumulated in the reticuloendothelial cells of the liver and spleen, thus allowing a roentgenological demonstration of these organs. The potential danger of the radioactivity of the injected substance immediately brought out protests against its use for diagnostic purposes. The time which has since elapsed allows us to evaluate better the arguments pro and con. There is no doubt that Thorotrast remains in the body almost indefinitely, for example, five years after injection 27 per cent of the substance has been found in the liver alone.<sup>25</sup> Several reports showed, though not absolutely convincingly, evidence of late damage, such as fibrosis in the liver, spleen and adjacent organs.<sup>26</sup> The radioactivity of the amount of Thorotrast used was shown to approach that of minimal doses of radium which have been proved to produce chronic radium poisoning. Nevertheless, other authors<sup>27</sup> have stressed the absence of any demonstrable injury in a group of cases observed over a period of several years.

On the whole, there remained enough doubt in the minds of most roentgenologists to prevent the indiscriminate use of this substance for the demonstration of the liver and spleen. Furthermore, with the passage of time there is now less necessity for such a contrast demonstration. Ordinarily, the outlines of the liver and spleen can be recognized on good flat films of the abdomen. Finally, the differential diagnosis of questionable tumors in the left upper abdomen, as well as the diagnosis of cirrhosis of the liver, has been greatly improved by the roentgenological demonstration of esophageal varices. However, a nontoxic dye permitting the visualization of healthy liver parenchyma should be of great practical value, particularly in the search for liver metastases. It is therefore of interest that Beckermann and Popken<sup>28</sup> have recently succeeded in visualizing the liver and spleen by the intravenous injection of colloidal organic iodine compounds. These substances are not radioactive and are apparently nontoxic. If the preliminary report is confirmed, a new field for routine roentgenological examination seems to be opened up.

#### KYMOGRAPHY AND BODY-SECTION ROENTGENOGRAPHY

Among the roentgenological methods which have been introduced in recent years are two which require mention because they involve interesting technical procedures and because they have been widely discussed. They are kymography and body section roentgenography.

CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 25181

## PRESENTATION OF CASE

*First Admission* A sixty-four-year-old married colored Bermudian janitor was admitted complaining of inability to void of two days' duration.

For the past year he had noticed increased slowing of the urinary stream. For several months he had had dyspnea on exertion and orthopnea, as well as transient edema of the ankles. During the previous two weeks he had taken digitalis. He had not had precordial pain. There was no history of rheumatism. He had no knowledge of syphilis.

Physical examination showed a well-developed, thin, colored man who was moderately short of breath. Each eye showed a marked arcus senilis but was otherwise negative. The neck veins were not engorged. There was moderate enlargement of the heart to the left. The apical first sound was loud, with a faint, poorly transmitted systolic blow.  $A_2$  was accentuated and tympanic,  $P_2$  was also loud. A faint diastolic murmur was heard along the left border of the sternum. There were frequent extrasystoles. The blood pressure was 130 systolic, 50 diastolic. Examination of the lungs showed rales at both bases and signs consistent with a moderate amount of fluid in the left pleural cavity. The liver was questionably palpable. There was no edema. The prostate was symmetrically enlarged, being three times normal size.

The temperature was 100.5°F, the pulse 95, and the respirations 48.

Examination of the urine showed a trace of albumin and 30 to 50 red cells and 5 to 10 white cells per high-power field. The blood showed a red-cell count of 3,950,000 with 70 per cent hemoglobin, and a white-cell count of 9600. A blood Hinton test was positive, and the Wassermann test weakly positive. The nonprotein nitrogen of the whole blood was 32 mg per 100 cc. An electrocardiogram showed slight left-axis deviation, low  $T_1$  and diphasic  $T_2$  and  $T_3$ .

An intravenous pyelogram showed prompt excretion of the dye on the right side, slight delay on the left. The kidney pelvis were negative. There was evidence of Pager's disease in both ilia and in the second lumbar vertebra. X-ray films

of the chest showed the heart enlarged in the region of the left ventricle. There was increased density in the left lower and middle lung fields. The right costophrenic angle was clear. A lateral view showed that the area of increased density lay posteriorly, having a well-defined anterior convexity. There was a localized area of decreased density in the anterior mediastinum just above the diaphragm, with a well-defined border of slightly increased density. The intercostal spaces on the left side were narrowed, and there was some periosteal new bone formation about several ribs.

On the third hospital day a bilateral vasectomy was done. The patient was taught to catheterize himself, given digitalis and sent home on the twenty-first hospital day. He was to return for prostatectomy after improvement of his general condition.

*Final Admission* (three months later) He complained of severe dyspnea and orthopnea of six days' duration, without chest pain. Four and a half grains of digitalis daily had been continued. Three days before re-entry he vomited once.

Physical examination showed the patient in marked respiratory distress, with Cheyne-Stokes respiration. The pupils were large and reacted well. The neck veins were full. The tongue was cyanotic. Examination of the heart was essentially the same as on the previous examination. The blood pressure was 130 systolic, 60 diastolic. The lungs showed rales at both bases, with evidence of a moderate amount of fluid at the right base. The liver edge was not palpable. There was no edema.

The temperature was 98.6°F, the pulse 140, and the respirations 25.

The urine showed a slight trace of albumin. The blood showed a red-cell count of 4,700,000 with 86 per cent hemoglobin, and a white-cell count of 16,100 with 92 per cent polymorphonuclears. The serum nonprotein nitrogen was 45 mg per 100 cc. A blood Hinton test was positive, a Wassermann test weakly positive.

The patient was kept in a cardiac bed and given oxygen and carbon dioxide without improvement. An electrocardiogram on the second hospital day showed a variable P-R interval due to ventricular escape. The ventricular rate was 90.  $T_1$  and  $T_2$  were inverted,  $T_3$  diphasic, and  $T_4$  showed late inversion. On the third hospital day the patient was semicomatose and did not respond to various stimulants. The respirations were 32, the temperature 98°F, and the pulse 95. The blood pressure had risen slightly. On the following day there was no change, but on the fourth day the patient rapidly became worse, the respirations ris-

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DR SPRAGUE Could you say anything about the aorta in the lateral view?

DR HAMPTON I think it is diffusely dilated. I do not see any aneurysm.

DR SPRAGUE There would seem to be a definite increase in the first portion of the arch.

DR HAMPTON It is dilated.

DR SPRAGUE One might assume, on hearing the discussion, that these findings were present before and after he came back. What was found at the right base was in addition to what he had had at the left base, and was no doubt due to congestive failure. This left basal lesion with its relation to the diagnosis of syphilis is the bothersome thing.

At the time of his final entry there was very severe dyspnea and orthopnea without pain and signs of increasing congestive failure, with a febrile episode at the end which was probably due to a pneumonic process. I am trying to hook this up into one diagnosis, that of a syphilitic process.

You do not see anything in this chest film that makes you think he had any metastatic lesion from the prostate?

DR HAMPTON No.

DR SPRAGUE The other findings at the end of his illness are of no help in making a diagnosis.

He was an arteriosclerotic individual who was very ill and who probably had a diffuse syphilitic aortitis. From what evidence we have, it is not possible to say he had an aneurysm of the descending aorta with pulmonary collapse. He may have had some aneurysmal dilatation of the arch or even of the intrapericardial portion of the aorta, and the story certainly suggests progressive narrowing of the coronary ostia. I am unable to connect the signs at the left base with the underlying condition but am unwilling to guess at anything other than a syphilitic process in the pleura. The final cardiac episode with this type of arrhythmia and dissociation can well be explained by the large doses of digitalis.

DR F DENNETTE ADAMS How often do you see a syphilitic patient die of congestive failure with no more evidence of valvular damage than this man showed?

DR SPRAGUE I have to invoke involvement and narrowing of the coronary ostia. With such lesions, syphilitic patients may die with severe dyspnea and congestive failure and without a great deal of peripheral edema.

DR CHAMP LYONS These blebs are not numerous enough to assume that emphysema precipitated cardiac failure?

DR SPRAGUE One would think in such a case that there would be some evidence of right-sided

strain, such as cor pulmonale, rather than left-sided cardiac hypertrophy.

DR LYONS Could not prolonged toxemia from suppuration in so old a man be responsible for myocardial failure?

DR PAUL D WHITE He did have fever on the first admission and leukocytosis on the second.

DR SPRAGUE The temperature was only 100.5°F, and he came in with an obstructing prostate.

Do you believe, Dr White, that we can say that toxemia from infection induces heart failure?

DR WHITE It may if the heart is already diseased. Moreover, this man was old enough to have arteriosclerotic coronary changes, besides the syphilitic aortitis affecting the mouths of the coronaries.

DR SPRAGUE The electrocardiogram is consistent with a digitalis effect. We know he had arcus senilis, but that is all in the way of sclerotic change.

DR WHITE Probably the arrhythmia was not directly responsible for death, although in combination with other factors it may have played something of a role. The last straw was doubtless the pulmonary complication on top of coronary insufficiency, which in turn was largely of syphilitic origin.

#### CLINICAL DIAGNOSES

Syphilitic heart disease with aortic regurgitation  
Syphilitic aortitis  
Generalized and cerebral arteriosclerosis  
Benign prostatic hypertrophy

#### DR SPRAGUE'S DIAGNOSES

Syphilitic aortitis with aortic regurgitation  
Chronic syphilitic lesion of the left pleura?  
Arteriosclerosis  
Obstructing prostate (benign)  
Digitalis intoxication  
Terminal bronchopneumonia

#### ANATOMICAL DIAGNOSES

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Hypertrophy and dilatation of the heart  
Gumma of left pleural cavity  
Thrombosis of right auricle and periprostatic and popliteal veins  
Infarcts of lung, multiple  
Benign hypertrophy of prostate  
Cystitis, chronic  
Pyelonephritis, chronic  
Arteriosclerosis

ing to 50, the pulse to 150 and the temperature to 103°F. An electrocardiogram at this time showed an auricular rate of 105 and a ventricular rate of 140.  $T_1$ ,  $T_2$  and  $T_4$  were inverted. There were nodal tachycardia and nearly complete A-V dissociation. The patient rapidly failed and died a few hours later, on the fourth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR HOWARD B SPRAGUE. I am prepared to modify whatever views I may have about the final episode in this case in accordance with what Dr Hampton may be able to tell me about the x-ray films.

On the first admission we have an arteriosclerotic Negro, with positive Hinton and Wassermann tests, who came in with an obstructing prostate. There is no evidence to show that this was a cancer of the prostate, but there may have been some neoplastic disease in it. Our attention here is focussed on the heart and lungs and the renal situation. So far as the heart is concerned we have left ventricular enlargement, an aortic diastolic murmur, a degree of aortic regurgitation which can be measured by the arterial pulse and the low diastolic level, an aortic second sound which is accentuated and tympanitic, and an increase in the pulmonary second sound, all of which indicate left ventricular failure and pulmonary hypertension. The first sound was loud instead of diminished, which is rather unusual. So far as etiology is concerned, there does not seem to be adequate reason to suspect hypertensive or rheumatic heart disease. At his age and in the face of the positive blood it would take a good deal of courage to avoid a statistical bias and say this man did not have aortic syphilis. I assume that he had.

He showed signs consistent with fluid in the left pleural cavity. I am not quite clear about this part of the history. Later on we hear that he came back and showed rales at both bases, with evidence of a moderate amount of fluid at the right base. I do not know whether it means in addition to the signs at the left base or that the signs at the left base had, in the meantime, cleared up. If this were an effusion in the left base that cleared up under digitalis and recurred on the right, we might have a different point of view. His renal situation at the time of the first entry was impressively poor. The nonprotein nitrogen was 32 mg per 100 cc, and toward the end it was 45 mg. He showed only a little albumin in the urine. He was sent home at that time on digitalis and for three months kept it up on a ration of  $4\frac{1}{2}$  gr a day, which is a good sized

dose and may be responsible for the final disturbance of cardiac rhythm. He had evidence of digitalis toxicity. We have only one x-ray examination and I should like to have Dr Hampton talk about that. It was taken at the first admission.

DR AUBREY O HAMPTON. We have two films. The second was taken primarily for obtaining a lateral view of the chest. There is a large heart, apparently due to left ventricular hypertrophy. The supracardiac shadow is widened without evidence of aneurysm, but the usual curve of the aortic knob is gone. The aorta is dilated in the ascending portion, not enough to make a positive diagnosis of aneurysm or to rule out the possibility of its being due to hypertension.

This process at the left base is quite interesting in view of the fact that it was completely ignored by the surgeons. The X-ray Department was upset about that. We thought it was obvious evidence of longstanding infection in the pleura, in the lateral view, it is quite sharply defined and in all respects corresponds to an encapsulated empyema. Dr Edward D Churchill has pointed out that the ribs in the region of chronic inflammatory disease in the pleura are definitely thickened, and the rib changes in this case make us more certain that the shadow is due to infection. We thought at first that this periosteal thickening always meant pus, but it does not. It can occur with longstanding pleural effusion without pus. So we cannot insist that in this case there is pus in the pleural cavity, but we can be sure that the disease is inflammatory and that the lesion is sharply localized and has the appearance of encapsulated fluid. We also saw this sharply defined area of rarefaction, seen only in the lateral view, at the anterior margin of the lung, which looks like a bleb. Although there is no other evidence of gross emphysema in the chest and although we could interpret this as a pulmonary cyst, the latter are rare and the lesion is probably an emphysematous bleb.

DR SPRAGUE. What is your reaction to the statement about the ribs' being close together?

DR HAMPTON. That means there is retraction on the left side of the chest due to longstanding pleurisy. There is no question that this man had had an infectious process in the pleura for a long time.

DR SPRAGUE. What about the problem of pulmonary collapse on that side?

DR HAMPTON. There is no evidence of collapse of the lung except this area of density, which can be explained by the shadow in the pleura.

DR SPRAGUE. Do you think this is all outside the lung?

DR HAMPTON. Yes.

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Infarcts of lung, multiple  
Benign hypertrophy of prostate  
Cystitis, chronic  
Pyelonephritis, chronic  
Arteriosclerosis

## PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY The postmortem revealed very obvious syphilitic heart disease. The aorta showed rather diffuse dilatation, with numerous scattered stellate scars. The coronary mouths appeared to be nearly 1 cm. above the aortic cusps, a finding indicating that the cusps had been drawn down and retracted, as is so common in syphilis. They were not, however, separated as they often are, so that the degree of regurgitation was, I think, a mild one. The mouth of the right coronary was quite markedly narrowed by scar tissue. It showed a few atheromatous plaques but no further narrowing, and the left coronary was free. The heart was moderately hypertrophied. The interesting finding in the autopsy was a large lesion at the base of the left pleural cavity (Fig. 1). It con-

adherent to, but easily separable from, the lung. On section many irregular, yellowish necrotic areas were found scattered through the fibrous tissue. There were no purulent foci, no cavities and no areas of solid calcification, although the tissue seemed slightly gritty on section.

The problem centers around what this mass is. The gross appearance is perfectly consistent with that of a gumma, but the location is an unusual one. Stains for spirochetes are negative. The histology does not in the least suggest tuberculosis. It is possible for an undrained empyema to organize and leave a scar which might be something like this. On the other hand, my personal hunch is that the lesion is probably gumma. I do not know of any way to prove it with certainty.

A PHYSICIAN Are not the empyemas which organized more apt to show calcium?

DR. MALLORY Yes, I should expect more calcium. There was some, but just occasional small gritty particles.

He had, of course, an enlarged prostate and the usual sequelae of that—cystitis, dilated ureters, dilated kidney pelvises on both sides and generalized infection of the urinary tract. The terminal episode in this case was one of pulmonary embolism. He had multiple infarcts throughout both lungs, and there was a choice of numerous sources from which the emboli might have come. There were thrombi in the right auricle and in both popliteal veins and many in the periprostatic plexus, one of which I think probably was the source.

DR. SPRAGUE Do you think we always ought to say pulmonary embolism? I have got tired of saying it in every case, and with this temperature reaction I thought I should take a chance and say pneumonia.

DR. MALLORY In saying pulmonary embolism rather than terminal pneumonia I think one is statistically more apt to be right.



FIGURE 1 Posterior View of the Thoracic Organs

To the left of the aorta is the transected wedge shaped gummatous mass which occupied the lower portion of the left pleural cavity

sisted of a roughly pyramidal mass of fibrous tissue measuring 7 by 5 by 4 cm. It was firmly attached to the lower four thoracic vertebrae and the corresponding ribs but did not penetrate the periosteum and involve the bones. On its medial aspect it was adherent to the aorta, but a plane of cleavage could easily be developed. It was

## CASE 25182

## PRESENTATION OF CASE

A fifty-seven-year-old married commercial agent was admitted complaining of intermittent incontinence, numbness in the extremities and abdominal distention.

At the age of twenty-one years the patient had had gonorrhea and a venereal wart on the prepuce which was "burned" and healed in about two weeks. A urethral stricture developed which was dilated with sounds and apparently cured in about six months. No blood test was done, and he remembered no skin eruption. Until seven years before entry he was well and healthy, and at this time his wife noted that he hesitated in his speech

This apparently did not progress significantly. One and a half years before admission intermittent enuresis developed, but there was no incontinence during the day. Three months before entry this condition became considerably worse and he visited a physician who found "positive serology." Intravenous injections were begun at this time. Three days before admission he noted numbness in both lower extremities, muscle twitchings and beginning ataxia, worse on the right side. He had occasional severe tonic contractions of the calf and thigh muscles, but no pain. During the previous twenty-four hours there was oliguria, and distention of the lower abdomen. He had had no rectal incontinence but recently had noted increasing constipation.

Physical examination showed a moderately obese male in no acute discomfort. The pupils were very small and did not react to light. The mouth was said to be asymmetrical, but there was no noticeable muscular weakness and no further details were recorded. Examination of the heart and lungs was not remarkable. The blood pressure was 140 systolic, 80 diastolic. The abdomen showed generalized distention. The bladder was distended. Rectal examination showed normal sphincter tone. The Romberg test was positive. There was moderate ataxia. Pain and temperature sensations were diminished over both lower extremities. There was almost complete absence of vibratory sense. The abdominal reflexes were absent except in the left hypochondrium. Babinski signs were positive bilaterally. The finger-to-nose and heel-to-shin tests were poor.

The temperature was 98.2°F, the pulse 82, and the respirations 22.

The urine examination was negative. The blood showed a red-cell count of 4,780,000 with 85 per cent hemoglobin, and a white-cell count of 8800 with 71 per cent polymorphonuclears. A blood Hinton test was positive. A blood smear showed malarial parasites. A lumbar puncture showed an initial pressure of 150 mm of water and normal dynamics. The spinal fluid showed 2 lymphocytes per cubic millimeter and a total protein of 67 mg per 100 cc. A goldsol curve was 5555532100. A spinal-fluid Wassermann test was strongly positive.

On the second day after entry the patient was inoculated with malarial organisms. During the first week in the hospital the patient's abdominal distention increased and there was increasing discomfort. Examination showed generalized abdominal distention, and the cecum was thought to be especially dilated. There was no tenderness, spasm or audible peristalsis. An x-ray of the abdomen at this time showed that the right half of the colon was filled with gas

and markedly dilated. The cecum was huge. The small intestine also contained gas and was dilated. On the following day the abdominal pain had increased in severity and the patient vomited foul-smelling material several times. Distention became more marked, the pulse rose to 110, and the patient perspired freely. The temperature, which had not been above 99°F during the preceding eight days, rose to 100°F. Shortly thereafter a laparotomy was performed.

He died on the second postoperative day, and during the last two days his respirations rose from 20 to 35.

#### DIFFERENTIAL DIAGNOSIS

DR. OLIVER COPE. I should like to discuss the differential diagnosis before we turn to the x-ray films, because I suspect that the latter may be helpful in making the diagnosis.

DR. TRACY B. MALLORY. The films have been lost, so you need not be afraid of their giving away the diagnosis.

DR. COPE. Then I should like to recall an incident which occurred during the study of another patient seen here recently. This patient had the disease from which I suspect the patient under discussion suffered. The surgeons, among them myself, and members of the X-ray Department were struggling to make a diagnosis. The x-ray films were spread out on the illuminator. At this moment Dr. Holmes walked by, glanced at them casually and said, "H'm, neurosyphilis, I see," and passed on into his office. That is why I thought it would be better to wait until after my discussion before we allowed Dr. Holmes to look at the films.

I think the diagnosis lies between a "cord colon" and true mechanical obstruction of the large bowel. It is obvious that the man had neurosyphilis and, with it, involvement of the spinal cord. Whether the recent malarial therapy had anything to do with the symptoms when he entered the hospital and those for which he was operated on, it is difficult to tell. It is certain from the history that he had a distended "cord bladder," with enuresis. The disease had recently been progressive, and it is significant that the first intestinal symptoms appeared when the bladder symptoms were becoming more pronounced.

I am not going to try to discuss the various lesions in the colon which, through production of mechanical obstruction, might enter into the differential diagnosis. I want to weigh mechanical obstruction, on the one hand, against the type of dilated colon seen in central-nervous-system syphilis, on the other. In favor of paresis or central-nervous-system syphilis as the origin of

the symptoms in this patient is the fact that we know this disease was already present and that it had already produced a cord bladder. Whether the recent exacerbation of bladder symptoms, together with the onset of symptoms from dilatation of the colon, was due to spreading disease in the cord from malarial treatment, I cannot tell, and I am not competent to discuss it. Also in favor of the tabetic colon is the observation that the first abdominal distention occurred without any symptoms other than constipation. It is true that he had some discomfort later on, but this he might have had from abdominal distention rather than from intestinal dilatation. If there had been a primary mechanical obstruction I should have expected intermittent pain. Of course the lack of sensation may have been due to injury in the cord, since we know that there was loss of sensation in the extremities. In other words he might have had true mechanical obstruction, and pain was absent because of the nerve lesion. The examination of the abdomen is also in favor of the diagnosis of cord colon. The absence of audible peristalsis, of tenderness and of spasm is noted, and we should expect one or all these findings with this degree of dilatation had it been due to pure mechanical obstruction. In the cord colon, peristalsis is not audible because feces in the cecum and right colon are usually semi-solid and there is not the swish and rush of fluid content encountered in mechanical obstruction.

The diagnosis of cord colon does not necessarily explain the fecal vomiting which the patient had terminally, and also does not take into account, so far as my own experience is concerned, the dilatation of the small bowel. I do not know, however, why dilatation of the small bowel cannot occur just as well as dilatation of the large intestine, since the nerve lesions which lead to dilatation of the latter would also be present in the levels involving the former. The fecal vomiting is not explained unless we assume the obstruction had come to such a point that there was an actual backing up of contents of the small intestine into the stomach. In other words, the nerve lesion and consequent functional disability had resulted in a virtual mechanical obstruction due to fecal impaction, and the fecal vomiting was secondary to that. It is my inclination to put the picture together in that way.

As to the final contributing cause of death, we are not told what the operation was. From the record as given the only thing we have as a clue is the rise in respirations to 35. That could have been due, of course, to a postoperative pulmonary complication, or to encroachment on the vital capacity in the chest due to increasing abdominal distention. Another possibility, which undoubtedly

entered to some extent into the immediate cause of death, was the electrolyte imbalance subsequent to the intestinal obstruction and vomiting. A third possibility is peritonitis subsequent to operation, and increasing distention.

In conclusion, I am therefore forced to make a diagnosis of syphilitic paresis with cord paralysis, a cord bladder and a cord colon, if I may coin the expression. With extensive dilatation of the colon there occurred electrolyte loss from vomiting, and possibly pneumonia and peritonitis, as contributing causes of death.

DR. MALLORY The operation was simply a cecostomy.

DR. COPE That would not change my diagnosis.

DR. HARRY C. SOLOMON I think the first thing to comment on is the correct and very clever diagnosis as regards the colon. I might add that it is very uncommon to get a tremendously bloated colon of this sort in any of the syphilitic diseases of the spinal cord.

There are one or two omissions in the history. This man, when I first saw him, had been under the care of a physician who had treated him for two or three months prior to his coming to this hospital. Just prior to admission he had had a sudden onset of what was said to be ataxia. He became suddenly incapable of walking, and within twenty-four hours he was admitted. Before this he had been receiving tryparsamide, and the question arose whether there was any relation between the drug and the sudden collapse of the lower extremities, whether treatment had caused a Herxheimer reaction or some degeneration of the spinal cord. He was given malarial treatment on his arrival.

I take a good deal of exception to the diagnosis of general paresis. Clinically this man showed no symptoms of cerebral involvement. Before a diagnosis of general paresis, which is by ordinary definition a psychosis, is definitely established, there has to be evidence of mental changes. This man had a positive goldsol curve which is common enough in cord disorders as well as characteristic of general paresis. Our examination, aside from the pupils, which so commonly show abnormalities in cord syphilis, showed no evidence of lesions in the cerebrum, and the problem seemed to be merely that of a cord lesion. He had something that suggested a transverse lesion. Furthermore, he had symptoms characteristic of disorders of the lateral and posterior columns—a loss of vibratory sense and urinary difficulty.

It was after malarial treatment had been started that his colon began to blow up quite progressively and fairly rapidly. Stupes, enemas, rectal tubes and the like had no effect on the situation. There

fore Dr E Parker Hayden was asked to come in and see him as regards operative procedure. The x-ray films, as indicated, were very characteristic of an ileus, just dilated bowel without any evidence of obstruction. Dr Hayden opened the colon and drew off a good deal of gas, a procedure which gave the patient quite a bit of temporary relief. He immediately began to blow up again in the same fashion, and he succumbed to what seemed to be a bronchopneumonia.

DR GEORGE W HOLMES: This patient had only one film taken and that showed the gas-distended colon. The films which I am putting up now come from another very similar case, the one to which Dr Cope referred at the beginning of his discussion. The first thing that one notices is the prominent aorta. That would naturally lead you to suspect that the patient had syphilis but is not enough to make that diagnosis. It is a well-known fact that in a certain number of patients with neurosyphilis we do get a relaxed and dilated colon. Dr James R Langley examined a number of cases at the McLean Hospital and found in a high percentage an enormously dilated colon. Of course the appearance in this film could be due to obstruction, but at the time I saw it, an enema had been given and we knew there was no obstruction in the colon. This emphasizes the danger, in cases of dilated large bowel, of accepting a diagnosis made from plain films alone. The surgeons have objected to our giving a barium enema in this type of case, and I think they are justified, because it interferes with the operation, but unless we do it we can never be certain whether there is obstruction or only a relaxed dilated bowel. The points, then, of interest in this case are first, the dilated colon which was proved by barium enema not to be due to obstruction, and second, the prominence of the aorta.

DR SOLOMON: The malarial treatment was given as a last desperate attempt, in the case of the sudden onset of symptoms suggesting transverse myelitis, such as this man showed, one has no assurance that anything else is going to give relief.

#### CLINICAL DIAGNOSES

Central-nervous-system syphilis  
Paralytic ileus  
Bronchopneumonia

#### DR COPE'S DIAGNOSES

Central-nervous system syphilis  
Cord colon  
Cord bladder

#### ANATOMICAL DIAGNOSES

Central nervous system syphilis, meningovascular type  
Myelitis

#### PATHOLOGICAL DISCUSSION

DR MALLORY: At operation an enormously distended cecum was found. It was so large it was almost impossible to manipulate. It was necessary to put in a needle and withdraw a considerable amount of gas before a cecostomy could be done. That drained the gas from a limited portion of the ascending colon but not from the distended descending colon on the left side. He proceeded downhill with renewed and progressive dilatation of the intestines. At the time of autopsy the entire small bowel was markedly dilated and the large bowel looked as if it had never been decompressed. The rest of the autopsy showed nothing that could be considered as the cause of death. The lungs showed diffuse collapse, undoubtedly due to the high diaphragm, and marked congestion and edema, which might be interpreted as evidence of shock. There was no significant amount of pneumonia. The examination of the spinal cord did show a localized lesion in the thoracic portion. I shall ask Dr Kubik to describe it.

DR CHARLES S KUBIK: The arachnoid of the entire thoracic cord was pearly gray in color, and opaque. There were fibrinous adhesions in the subarachnoid space, and the cord in the mid-thoracic region was softer than normal. A careful search did not reveal evidence of thrombosis in any of the visible spinal arteries. Microscopic sections of the spinal cord, brain stem and brain showed a slight to moderate lymphocytic exudate, perivascular infiltration with lymphocytes and plasma cells, and varying degrees of endarteritis. There was a thinning out of nerve fibers along the periphery of the cord. In the upper third of the thoracic cord on the right side was a large focus of degeneration involving the posterior half of the lateral column and extending a short distance into the posterior column. The degeneration was not complete. Although the myelin was completely destroyed, many of the axis cylinders were preserved. This had the appearance of a vascular lesion and was unquestionably responsible for the myelitic symptoms.

The case provides a fairly good example of meningovascular neurosyphilis.

DR JOHN D STEWART: The stomach was not dilated?

DR MALLORY: Not particularly.

DR J H MEANS: I should like to ask if any attempts were made to deflate him by Dr Jacob Fine's method of oxygen inhalation.

DR MALLORY: That apparently was not tried, nor was spinal anesthesia.

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### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., Secretary  
330 Dartmouth Street  
Boston

### BLEEDING IN THE PUERPERIUM

Mrs. M. G., a twenty-five-year-old primipara, at term, was admitted to the hospital at 8 a. m. on September 17, 1932 in mild labor. The membranes had ruptured.

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

The family history was irrelevant. The patient had had no childhood diseases, but she had undergone an appendectomy at nine years of age. Catamenia began at twelve, were regular with a twenty-eight-day cycle and lasted four days. Her last period was December 10, 1931, making her due for delivery September 17. The prenatal period had been entirely normal.

Examination one hour after admission showed the head well engaged in the LOA position, there was no dilatation of the cervix. Contractions were occurring at six- to eight-minute intervals.

Under Sodium Amytal analgesia the patient progressed slowly to full dilatation at 3.30 a. m. the following morning. Under nitrous oxide and oxygen anesthesia an 8 lb., 5 oz., baby was delivered by low forceps at 4.30 a. m. There was a small vestibular tear, in which two stitches were placed, but no perineal laceration. The placenta separated in fifteen minutes and was expressed by the method of Credé. As the placenta was being delivered, the patient came out of anesthesia and moved violently, resulting in some tearing of the placenta as it was removed from the vagina. The placenta was pieced together after delivery and appeared to be complete. As there was no abnormal bleeding and the fundus contracted well, exploration of the interior of the uterus seemed contraindicated.

The temperature remained normal until the evening of the third day when it rose to 101°F, the pads were slightly foul, and there was some tenderness in the left lower abdomen. The temperature remained elevated for three days, reaching a maximum of 102°F, then dropped to normal on the morning of the eighth day and remained normal until the evening of the tenth day. The lochia during this time had a foul odor but was serous in character. Treatment had been limited to ice applied to the lower abdomen and elevation of the head of the bed. On the evening of the tenth day the patient passed two large blood clots, and almost simultaneously the temperature rose to 103°F. One half drachm of fluid extract of ergot, every four hours, was prescribed. The patient continued to flow freely but not alarmingly. The temperature remained between 103 and 104.5°F, and the pulse rose gradually to 120 but was of good quality. One cubic centimeter of posterior pituitary extract was given hypodermically every four hours. On the eleventh day the patient had a severe chill. On the morning of the twelfth day the bleeding had become alarming in amount and the pulse had risen to 130 and had become definitely weaker. The temperature was 104.5°F. The white-blood-cell count was 10,350, and the red blood-cell count 2,420,000. A differential count

showed 75 per cent polymorphonuclears, 15 per cent lymphocytes, 4 per cent large mononuclears and 8 per cent miscellaneous cells. It was evident that active intervention must be taken despite the temperature.

Under light nitrous oxide and oxygen anesthesia the uterus was quickly but lightly curetted, and a moderate-sized piece of placental tissue and some additional debris were removed. The uterus was swabbed with 7 per cent tincture of iodine and tightly packed with sterile gauze. Two cubic centimeters of posterior pituitary extract was given intramuscularly, followed by 1 cc every four hours. Ice to the fundus was continued. Due partly to lack of co-operation on the part of the patient's family, a satisfactory transfusion donor could not be obtained.

In spite of the measures taken, the patient continued to ooze through the pack. Five cubic centimeters of hemostatic serum (La Penta) was given intramuscularly. The flow then diminished and gradually became brownish in color but still had a foul odor. The pack was removed forty-eight hours after the curettage, without further bleeding. The temperature continued to range from 98.4°F in the morning to 103 or 104°F in the afternoon. The vaginal discharge was scanty and serous in appearance, with a foul odor. Non-specific protein therapy in the form of 10 cc of sterile milk intramuscularly daily for five doses was tried with no effect on the temperature. The patient developed an abscess over the right deltoid muscle, probably resulting from an infected hypodermic-needle puncture, which was opened on the twenty-second day with no effect on the temperature. Repeated pelvic examinations were negative, as were blood cultures. About the twenty-third postpartum day a slight but progressive drop in both morning and evening temperatures began without additional therapy, and on the twenty-sixth day a sudden drop to normal occurred. The temperature thereafter remained normal, and the patient was discharged on the thirty-seventh postpartum day.

*Comment.* It is always difficult, no matter how carefully a placenta is examined, to be certain that it is intact. So often it appears ragged as though a piece were lacking that, unless bleeding occurs after the birth of the placenta, only rarely does one think of entering the uterus because of a piece that may be retained. Furthermore, such pieces of placenta are often spontaneously extruded with out any accompanying hemorrhage.

The temperature which this patient ran after the third day of her convalescence was undoubtedly due to a saprophytic infection. The treatment

of these cases when not associated with hemorrhage is always conservative. Ice to the fundus, a modified Fowler's position and oxytocics are almost always sufficient. When this patient began to bleed on the twelfth day, it was evident, in spite of her temperature, that the uterus contained retained tissue. Hemorrhage is the only indication for entering the uterus after delivery, and this is true even in the presence of sepsis. The more conservatively the uterus is explored the better it is for the patient. The pieces may often be removed with the fingers or by ovum forceps, but if a curet must be used, it should not be a sharp one and the operation cannot be done too delicately. It is surprising how little placental material may be obtained, it takes but a small piece to cause very free bleeding. Packing of the uterus after it has been explored in the presence of bleeding is an essential part of the performance. This pack is used to control further immediate bleeding and also acts as an irritant whereby other fragments of placenta may be loosened.

The use of LaPenta hemostatic serum, while apparently of value in this case, is not in general use. Transfusion at the time when the red count was 2,420,000 would certainly have been valuable.

While the placenta which caused this bleeding may have abetted the infection, it was not per se the cause of the infection. Cultures of the lochia might have been valuable for the establishment of specific treatment.

It should be borne in mind that every case, whether septic or not, which bleeds profusely after the first few hours after delivery is always associated with an intrauterine lesion. This may be a placental polyp or a true accreta, most frequently it is a piece of retained placenta. The symptom demands intrauterine exploration and, oftentimes, transfusion.

#### LEGISLATIVE NOTES

Below is listed the progress in the Legislature of some of the bills in which the Massachusetts Medical Society is interested.

##### FAVOR

*S 25b* Bill relative to the meaning of the terms rendering medical service, practice of medicine and holding oneself out as a practitioner of medicine and to exempt dentists, optometrists and chiropodists in certain cases from penalties provided for the unlawful practice of medicine. The bill was proposed by the Board of Registration in Medicine. It is favored by the Society with the addition of the following sentence at the end of Section 5A: "Such treatment shall include examination of any secretion, excretion or discharge of the living body."

This bill has been given leave to withdraw.

*H 59* Identical with *S 25b*.

This bill has been given leave to withdraw.

*H 60* Bill requiring annual licensing of qualified physicians.

With certain changes this bill has been favorably reported by the Committee on Public Health and given to the Committee on Ways and Means.

*H 72* Bill providing for the care of certain infants prematurely born. It was proposed by the Department of Public Health, and corrects defects in the previous bill.

This bill was amended to *H 2080* and has been passed to be engrossed.

*H 73* Bill providing for supplementary reporting of congenital deformities and birth injuries in infants. The bill was proposed by the Department of Public Health and requires that supplementary reports be sent to this department.

It has been passed to be engrossed.

*H 74* Bill requiring the clerk or registrar in each city or town to give to persons who file notice of intention of marriage suitable information concerning gonorrhea and syphilis. The bill was proposed by the Department of Public Health and it contains no compulsion.

A report of no legislation necessary has been accepted in the House.

*H 75* Bill making various changes in the laws relating to foods and drugs. The bill was proposed by the Department of Public Health in order to bring the state law into line with the new federal act.

It was heard by the Committee on Public Health on April 13.

*H 287* (revised) Bill providing for a marriage protection law by requiring a physician's examination and certificate before issuance of marriage licenses. This bill was proposed by Rep. Cutler and in its revised form is now favored by your committee.

It was heard before the Committee on Public Health on March 28.

*H 670* Bill providing for the issuance of certificates of approval of bacteriological laboratories by the Department of Public Health. The bill was proposed by the Massachusetts Public Health Association and is similar to the one favored by the Massachusetts Medical Society last year.

This bill was reported favorably by the Committee on Public Health and sent to the Committee on Ways and Means.

*H 852* Bill requiring licensing of hospitals, convalescent homes and nursing homes. This bill was proposed by the Massachusetts Central Health Council and provides for the Department of Public Health to set up certain standards of health and enforce them.

This bill has been favorably reported by the Committee on Public Health and referred to the Committee on Ways and Means.

*H 1407* Bill prohibiting aliens from practicing medicine. This bill was proposed by Rep. Vaughan and is poorly written. It provides that no license be granted to an alien until his first papers have been filed but allows certain very broad exceptions.

This bill was heard by the Committee on Public Health on March 14. An amended bill has been presented.

## OPPOSE

*H 551* Bill requiring that notices of intention of marriage shall be accompanied by a physician's certificate that neither party is infected with syphilis. This bill was proposed by Dr. William Frankman and also needs major revision before being satisfactory.

A report of leave to withdraw has been filed in the House.

*H 758* Bill providing authority to the Board of Registration of Nurses to limit further training of nurses of all classes and attendants under certain conditions. The bill was proposed by Miss Josephine E. Thurlow but is against public policy.

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This bill has been given leave to withdraw.

*H 1898* Bill providing for the establishment and administration of a system of health insurance. This bill was proposed by the State Industrial Council of the Congress of Industrial Organization (C.I.O.) and means complete state insurance medicine with a 4½ per cent pay roll tax. It represents real regimentation of physicians.

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CHARLES C. LUND, *Chairman*  
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## DEATHS

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McCREA was a director of the Masonic Hospital in Shrewsbury.

He was a member of the Massachusetts Medical Society, the American Medical Association and the Medical Examiners' Association.

His widow, a son and a sister survive him.

SCHORER—CORNELIA B. J. SCHORER, M.D., of Foxboro, died in Berlin, Germany, January 9.

Dr. Schorer received her degree from the Universität Zürich Medizinische Fakultät, Switzerland, in 1897. Before her retirement in 1933 she was a member of the resident medical staff of the Foxborough State Hospital.

She was a fellow of the Massachusetts Medical Society and the American Medical Association and was a member of the American Psychiatric Association and the New England Society of Psychiatry.

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Born in East Bridgewater, he received his degree from Boston University School of Medicine in 1898. After practicing in Somersworth, New Hampshire, for one year he attended the New York University College of Medicine, studying electrotherapy. In recent years he had continued studies in this specialty at Boston University. In 1903 he went to Worcester and shortly afterward became associated with the Hahnemann Hospital, where he was a staff physician at the time of his death.

Dr. Willis was a fellow of the Massachusetts Medical Society and the American Medical Association and was a member of the American Institute of Homeopathy and the Massachusetts Homeopathic Society.

His widow, a sister and two brothers survive him.

## MISCELLANY

## THE CYTOLOGY OF SPUTUM

When the practitioner sends a sputum specimen to the laboratory he expects usually to learn only whether or not tubercle bacilli are present. Much more can be learned by a careful study of the sputum, as Dr. S. Roodhouse Gloyne, pathologist at the London Chest Hospital, whose work has attracted widespread attention, has shown in the following article, which was prepared especially for *Tuberculosis Abstracts* and appeared in the May issue.

We are all apt to assume that everything that goes into a sputum cup is sputum. Saliva, postnasal and pharyngeal secretions which have trickled down the throat, even gastric contents resulting from retching may be confused with true sputum. The word will be taken here to mean the material which coughing ejects from the respiratory passages. Cytological examination often enables us to determine from what part of the respiratory tract the secretion comes and what its nature is.

Specimens should be as fresh as possible, because cells degenerate more quickly than do bacteria and a stale specimen is valueless for cytological purposes. The next thing is to select suitable portions for examination. There is only one safe rule, namely to select every portion which looks different in appearance from any other portion—mucoid, purulent, pigmented, blood stained, gelatinous, and so forth. The purulent portion is the least useful. The specimen may be poured into a wide dish (an ordinary bacteriological Petri dish) and placed on a light or dark background as required. It is not enough to take a



wild plunge at an evil smelling specimen with a platinum loop and to trust to luck. Each portion should be picked out with sterile forceps, and placed upon one end of a slide. A thin film is then made with the edge of another slide in the same way that one spreads a blood film for malaria parasites. In selecting the portions it is a good plan to go over the specimen carefully first with a hand lens. The technic used by the writer for staining films is a modification of that of Dudgeon and Wrigley (1) fix wet films in Schaudinn's solution (absolute alcohol, 1 part, saturated aqueous solution of mercury bichloride, 2 parts, with 3 per cent acetic acid added immediately before use) for five minutes, (2) pour off fixative and cover with 0.5 per cent iodine in 70 per cent alcohol for two or three minutes, (3) drain off this solution and cover with the following solution for two or three minutes sodium thiosulfate, 7.5 gm., 96 per cent alcohol, 100 cc., distilled water, 450 cc., (4) wash and stain with undiluted Delafield's hematoxylin for two or three minutes, (5) pour off stain and differentiate with 10 per cent hydrochloric acid (6) counterstain with Biebrich's scarlet or orange G, (7) dehydrate with absolute alcohol, clear with xylol and mount in neutral balsam.

The cells encountered may be classified into three groups cells which have migrated from the blood stream, tissue cells from various portions of the respiratory tract, abnormal cells resulting from various types of growth.

The cells of the first group are leukocytes and erythrocytes, and they are found in practically all sputums. The neutrophil polymorphonuclear cell is an essential part of the tissue response in all suppurative diseases of the lung. It is fundamentally a phagocyte and frequently contains organisms. After Lipiodol administration it will show engulfed oil droplets also. The predominance of the lymphocyte, which is such a useful diagnostic sign of tuberculosis in other exudates, is in the writer's view quite valueless in sputum. Lastly there is the eosinophil cell, commonly found in asthma.

Of the tissue cells, the commonest is the transitional squamous cell which covers the anterior surface of the epiglottis, the upper half of the posterior surface, the aryo-epiglottic folds and vocal cords and the pharynx. This cell is generally found in association with large numbers of the organisms of the catarrhal infections. A cytologic picture of this kind is common in the chronic catarrhs of the winter months. The ciliated columnar cell of the epithelium of the respiratory tract extends from the trachea down to the small bronchi and may squamate and appear in the sputum when the mucosa is ulcerated. It is often seen after the passage of a bronchoscope. The lining cells of the respiratory bronchioles and alveolar ducts are of a low cuboidal non-ciliated type, and they are not easy to distinguish from other mononuclear cells in sputum unless they are adhering together in plaques. *None of the cells in this group are phagocytes.* There is, however, a cell, conveniently considered here, which does phagocytose, namely the macrophage. It masquerades under many names, the heart failure cell, the dust cell, and so forth, but is really part of the reticulo-endothelial system and is an expert phagocyte. It is found in pulmonary tuberculosis, the pneumoconioses, chronic congestive failure and pulmonary edema, and may contain tubercle bacilli, carbon pigment, red-blood cells or hemoglobin pigment, as the case may be. The refractile particles of quartz or asbestos found in the pneumoconioses cannot be seen in the ordinary stained specimen.

With regard to the third group, excluding the hepatic cells of ruptured liver abscess and the lymphadenoma cell of Hodgkin's disease, which the writer has seen in sputum on only one or two occasions, the cells of this group

are neoplastic. In the case of secondary growths of the lung, any form of cell which is found in the primary growth may, of course, appear in the sputum, but in the primary malignant growths of the lung the cells for practical purposes arise from only two kinds of tumor, the oat-cell carcinoma and the squamous carcinoma. The oat-cell carcinoma is generally associated with a primary massive growth of the mediastinal nodes, and although this growth exerts great pressure on the main bronchi, it does not as a rule ulcerate and break down. The oat-cell, therefore, is not commonly found in sputum. Moreover, it is difficult to differentiate from granulation tissue cells and fibroblasts from the bronchial wall. This cell, therefore, should be diagnosed with the very greatest circumspection.

The squamous carcinoma cell is derived from bronchial growths. It is not sufficiently realized that bronchial carcinoma breaks down into cavity with even greater regularity than a tuberculous lesion. A single pulmonary abscess developing insidiously in a person of middle age without obvious cause is more likely than not to be due to a breaking down of a bronchial carcinoma. This cell can be found readily in the sputum but must be carefully distinguished from the normal transitional squamous cell of the upper respiratory tract. It is usually found adhering to its neighbors in small plaques, the individual cells of which exhibit marked diversity of form and size. In the early stage of its growth the cell shows a rounded nucleus with an open chromatin network, a large nucleolus, and a more or less clear cytoplasm with a cell envelope attached to its neighboring cell along the contiguous border, and prickle-cell arrangement. As the cell develops, vacuolation takes place and the nucleus is pushed to one side until it eventually comes to occupy a position near the cell envelope and is squeezed into a horseshoe shape. Keratinization of the cell follows, and the cytoplasm stains darker in consequence. All these stages may be found in the different cells of one plaque, and when keratinization occurs, it is possible to identify individual squamous carcinoma cells irrespective of plaque formation. Cell nests are rarely found in sputum films. The carcinoma cell does not phagocytose—a cardinal point in distinguishing it from the macrophage with which it is very easily confused in the early stage of neoplastic growth.

Space does not permit of a description of wet films and of frozen and paraffin sections, but the stained film method outlined above will amply repay careful study. It is possible thus to make a diagnosis of asthma, bronchial ulceration and chronic pulmonary edema, while it is of the greatest value in detecting bronchial carcinoma and will even enable one sometimes to gain corroborative evidence of pulmonary tuberculosis. The broad way to failure is to take the first portion of sputum which presents itself the straight and narrow way to success is to go over the specimen with a hand lens and select the particles for examination with discrimination. *Experientia docet*

## MAINE NEWS

### ANNUAL MEETING

The eighty seventh annual meeting of the Maine Medical Association will be held at Poland Springs, Sunday, Monday and Tuesday, June 25-26 and 27.

The central location of Poland Springs makes it the ideal situation for this meeting. The new management has granted reduced hotel rates with free parking of automobiles. Golf fees will be only one dollar for all-day playing. An orchestra will be available at dinner for entertainment and dancing. There will be an entertainment on Sunday evening.

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## CORRESPONDENCE

### LICENSE SUSPENDED

*To the Editor* The license of Dr Roland O Parris, of Falmouth, was suspended for one month from April 20, 1939, because of negligence in the postoperative care of a patient.

STEPHEN RUSHMORE, M.D., *Secretary,*  
Board of Registration in Medicine.

State House,  
Boston.

### REFERENCE STANDARD FOR THIAMIN CHLORIDE (VITAMIN B<sub>1</sub>)

*To the Editor* Synthetic Crystalline Vitamin B<sub>1</sub> has now been made the U.S.P. reference standard for what has long been known as Vitamin B<sub>1</sub> but is now called Thiamin Chloride, and this reference standard is now available, having been supplied by the U.S.P. Board of Trustees, with the co-operation of the U.S.P. Vitamin Advisory Board. Orders for this new reference standard should be sent to the chairman of the Committee of Revision, 43rd Street and Woodland Avenue, Philadelphia.

Thiamin Chloride, as a crystalline substance, has been proposed for inclusion in the Second U.S.P. XI Supplement. If it is admitted, the physical and chemical tests will be sufficient to determine its quality and therapeutic activity but when present in preparations or in solution, or when a part of the vitamin B complex, its activity will have to be determined by the biological assay procedure recommended for official adoption.

E. FULLERTON COOK, *Chairman*  
U.S.P. Committee of Revision

43rd Street and Woodland Avenue,  
Philadelphia.

### SULFANILAMIDE AND DESQUAMATION OF THE SKIN

*To the Editor* For the past few months there has been considerable controversy between attending physicians and health authorities regarding children who have suffered from slight pharyngeal disturbances and who have later shown desquamation of the skin. Because of the possibility of their having had scarlet fever, these children have been sent home by school physicians, with loss of time from school and mental annoyance to the parents and attending physicians.

Recently I saw two cases of desquamation of the skin following the use of sulfanilamide. I think it would be well for medical inspectors of the health department to inquire whether or not such children had received sulfanilamide at the time of their illness, for the use of this drug might solve the mysterious desquamation of the skin, provided the attending physician were certain that there was no possibility of the diseases having been scarlet fever. At the present time, sulfanilamide is being given for almost every acute infection.

JOHN G. DOWNING, M.D.

520 Commonwealth Avenue,  
Boston

## REPORTS OF MEETINGS

### ALPHA OMEGA ALPHA LECTURE

At a regular lecture sponsored by the Harvard chapter of Alpha Omega Alpha, on Monday, January 16 at the

Harvard Medical School, President Donald Matson introduced the guest speaker, Dr Eugene F DuBois of the Russell Sage Institute of Pathology, Cornell Medical College, and the New York Hospital. Dr DuBois spoke on Heat Loss from the Human Body.

Dr DuBois described how he came to be interested in this study. His work in this field began twenty-three years ago with Dr Joseph C. Aub, and they established some standards of basal metabolism based on body surface area. Receiving further stimuli from problems in air-conditioning and malaria therapy, the Russell Sage investigators six years ago decided to limit their field to the study of heat loss.

Dr DuBois presented lantern slide charts to show a normal twenty-four hour curve of heat production and loss. On waking in the morning, one's heat loss is almost equal to one's heat production, both being at a low level. The subject of the experiment took a short run, the heat production curve went up steeply but the heat loss curve lagged far behind, which meant that heat was being stored. The subject returned to rest and to take a cold shower, whereupon the loss of body heat became much greater than its production. When the subject went to bed at night, the curves gradually dropped to the equal low level at the start of the experiment.

The process was described as a balanced scale, with the pointer representing body temperature at 37°C. Heat loss, on a foundation of radiation, convection and vaporization, is favored by such factors as a cooler environment, increased skin circulation and an increase in sweating and panting, which will swing the balance toward lower temperatures. On the other side of the scale is heat production, based on fundamental oxidation of carbohydrate, fat and protein, and made variable by excitement, exercise, increased basal metabolic rate, and so on, and tending to move the pointer toward higher temperatures.

The factors involved in loss of body heat can be divided into physical and physiological ones. In considering the physical factors, it should be appreciated that man's specific heat being 0.82, which is lower than that of water, a temperature rise of 1°C in a 70-kg man requires the addition to the body of 57 calories. The skin has extraordinary heat-insulating properties, compared with the conduction value of cork, which is 0.0007, epidermis, muscle and fat have values from 0.00047 to 0.00050. Man, in addition, has the power of changing the properties of his skin. A 70-kg man has 1.8 square meters of surface area and a temperature gradient from within outward of 1.8°C to 10 cm in depth. The skin is a 99-per-cent perfect black-body radiator, there being not much difference between the skins of Negroes and Whites. The amount of moisture exuded is also a factor.

The physiological factors deal with the vascular, nervous and endocrine systems. Blood flow from within outward transports heat to the surface. Over the veins one can detect colder streaks moving inward. The body is particularly able to control heat production and dissipation, and the amount of moisture in the skin. The skin is extremely sensitive to temperature changes, for example, the skin of the forehead has been found able to detect within two or three seconds a temperature change of 0.003 C.

Dr DuBois then took time to review briefly the literature on the subject to show how the study depended on the development of measuring instruments for determining values of heat loss by radiation, convection and vaporization. These are governed by physical laws. At the start of the work, he had difficulty in measuring convection, and Dr James G Hardy, a physicist, was asked to

The usual conferences will be held Monday and Tuesday mornings, but they will differ from those in the past in that several physicians will participate as leaders, each conference will run from 9 30 to 12 noon. There will be a clinicopathological session Monday afternoon. Monday evening a speaker from New York—name to be announced—will address the meeting. Three nationally known physicians will speak on Tuesday afternoon. Dr Morris Fishbein, editor of the *Journal of the American Medical Association* will be the speaker on Tuesday evening. Medical moving pictures will be provided, and special entertainment for the ladies.

#### WOMEN'S FIELD ARMY

The Women's Field Army reports that from January 23 to March 21 seventy-three districts were organized for complete participation in the 1939 educational campaign. This is most encouraging in view of the fact that almost all of this was done by mail. Every county is represented in the units organized.

In addition to the districts organized for active participation thirty will be covered by direct mail appeals and personal solicitations. Of this total, twelve districts have never participated in previous campaigns. With the permission of the Maine Medical Association and of Dr Edward H. Risley, chairman of the State Advisory Board, copies of the very fine editorial on the Women's Field Army, which appeared in the February issue of the *Journal of the Maine Medical Association*, were sent to all the daily newspapers and several of the weeklies, with the request that it be reprinted or that an article based upon it be given. This is bringing a most gratifying result and should answer conclusively the questions sometimes asked about the attitude of the physician and the Association toward the work of the Women's Field Army.

#### COUNTY MEETINGS

On April 11, Dr S J Thannhauser, of Boston, talked before the Knox County Medical Society, the title was Vitamin Deficiencies.

The Kennebec County Medical Society was addressed by Dr Samuel Levine, of Boston, on April 20, the title of his talk being Auscultation of the Heart.

On April 21, Dr Richard H. Overholt, of Boston, talked before the Cumberland County Medical Society, his topic was Some New Developments in the Management of Chest Lesions.

#### NOTES

The following physicians have recently become members of the Maine Medical Association: D Foster of Portland, Albert S Owen and E M Fuller, of Bath; H Grubin, of Lubec.

The following new panel discussions have been added to the list available for the county medical societies:

Cancer: Dr Edward H Risley, chairman, Waterville.  
Thoracic Surgery: Dr George E. Young, chairman, Skowhegan.

The Maine Public Health Association is conducting a Help Find Early Tuberculosis campaign urging people to become tuberculosis-conscious and tuberculosis-suspicious in order to cut down the large number of cases of advanced tuberculosis now being admitted to our sanatoriums.

A course in allergy is open, on application, to physicians of Maine under the auspices of the Bingham Associates. A

fee of \$25 is charged for the course, which is of one week's duration, but a fellowship fee of \$50 is allowed and a physician taking the course may obtain room and board at the hospital for \$10. Full information is available from Dr F T Hill, Waterville, or Dr Fred R. Carter, 22 Arsenal Street, Portland.

A teaching clinic was held at the Central Maine General Hospital on April 28, under the direction of Dr John Fraser, professor of obstetrics and gynecology, McGill University Faculty of Medicine, Montreal. A clinic was held in the morning, and ward rounds in the afternoon. In the evening Dr Fraser discussed "The Treatment of Hemorrhage in Late Pregnancy."

#### RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MARCH, 1939

DISEASES	MARCH 1939	MARCH 1938	FIVE YEAR AVERAGE*
Anterior poliomyelitis	0	0	0
Chickenpox	1181	1944	1341
Diphtheria	14	17	28
Dog bite	765	781	686
Dysentery bacillary	24	0	2
German measles	105	92	1238
Gonorrhea	384	463	482
Lobar pneumonia	900	654	652
Measles	4290	1259	4154
Meningococcus meningitis	5	9	19
Mumps	1015	1303	1165
Paratyphoid B fever	1	8	2
Scarlet fever	901	1712	1265
Syphilis	416	635	543
Tuberculosis pulmonary	345	291	315
Tuberculosis other forms	30	39	41
Typhoid fever	4	3	5
Undulant fever	3	4	2
Whooping cough	971	573	1146

\*Based on figures for preceding five years.

#### RARE DISEASES

*Diphtheria* was reported from Boston, 3, Cambridge, 1, Lawrence, 2, Medford, 1, Methuen, 2, Shrewsbury, 1, Taunton, 1, Woburn, 1, Worcester, 2, total, 14.

*Dysentery bacillary*, was reported from Boston, 1, Lowell, 1, Wrentham, 22, total, 24.

*Infectious encephalitis* was reported from Arlington, 1, Chicopee, 1, Norfolk, 2, total, 4.

*Meningococcus meningitis* was reported from Boston, 1, Gardner, 1, Southbridge, 1, Springfield, 2, total, 5.

*Paratyphoid B fever* was reported from Malden, 1, total, 1.

*Pfeiffer bacillus meningitis* was reported from Everett, 1, Lowell, 1, total, 2.

*Septic sore throat* was reported from Belmont, 2, Boston, 11, Fall River, 1, Lawrence, 1, Malden, 3, Taunton, 1, Wenham, 4, Westwood, 1, total, 24.

*Trachoma* was reported from Boston, 1, Milford, 1, Watertown, 1, Webster, 1, total, 4.

*Typhoid fever* was reported from Boston, 2, Framingham, 1, Saugus, 1, total, 4.

*Undulant fever* was reported from Gardner, 1, Kingston, 1, Lowell, 1, total, 3.

Lobar pneumonia, pulmonary tuberculosis, measles and undulant fever were reported above the five year average.

Scarlet fever, diphtheria, German measles, chickenpox and mumps were reported below the five year average.

Tuberculosis (other forms) showed record low figures for the third consecutive month.

Whooping cough, meningococcus meningitis and typhoid fever were reported below the five year average.

Animal rabies showed record low incidence for the fourth consecutive month. Foci in Canton and Haverhill were active.

## CORRESPONDENCE

### LICENSE SUSPENDED

*To the Editor* The license of Dr Roland O Parris, of Falmouth, was suspended for one month from April 20, 1939, because of negligence in the postoperative care of a patient.

STEPHEN RUSHMORE, M.D., *Secretary,*  
Board of Registration in Medicine

State House,  
Boston.

### REFERENCE STANDARD FOR THIAMIN CHLORIDE (VITAMIN B<sub>1</sub>)

*To the Editor* Synthetic Crystalline Vitamin B<sub>1</sub> has now been made the U.S.P. reference standard for what has long been known as Vitamin B<sub>1</sub> but is now called Thiamin Chloride, and this reference standard is now available, having been supplied by the U.S.P. Board of Trustees, with the co-operation of the U.S.P. Vitamin Advisory Board. Orders for this new reference standard should be sent to the chairman of the Committee of Revision, 43rd Street and Woodland Avenue, Philadelphia.

Thiamin Chloride, as a crystalline substance, has been proposed for inclusion in the Second U.S.P. XI Supplement. If it is admitted, the physical and chemical tests will be sufficient to determine its quality and therapeutic activity but when present in preparations or in solution, or when a part of the vitamin B complex, its activity will have to be determined by the biological assay procedure recommended for official adoption.

E FULLERTON COOK, *Chairman*  
U.S.P. Committee of Revision

43rd Street and Woodland Avenue,  
Philadelphia.

### SULFANILAMIDE AND DESQUAMATION OF THE SKIN

*To the Editor* For the past few months there has been considerable controversy between attending physicians and health authorities regarding children who have suffered from slight pharyngeal disturbances and who have later shown desquamation of the skin. Because of the possibility of their having had scarlet fever, these children have been sent home by school physicians, with loss of time from school and mental annoyance to the parents and attending physicians.

Recently I saw two cases of desquamation of the skin following the use of sulfanilamide. I think it would be well for medical inspectors of the health department to inquire whether or not such children had received sulfanilamide at the time of their illness, for the use of this drug might solve the mysterious desquamation of the skin provided the attending physician were certain that there was no possibility of the diseases having been scarlet fever. At the present time, sulfanilamide is being given for almost every acute infection.

JOHN G. DOWNING, M.D.

520 Commonwealth Avenue,  
Boston

## REPORTS OF MEETINGS

### ALPHA OMEGA ALPHA LECTURE

At a regular lecture sponsored by the Harvard chapter of Alpha Omega Alpha, on Monday, January 16, at the

Harvard Medical School, President Donald Matson introduced the guest speaker, Dr Eugene F DuBois of the Russell Sage Institute of Pathology, Cornell Medical College, and the New York Hospital. Dr DuBois spoke on "Heat Loss from the Human Body."

Dr DuBois described how he came to be interested in this study. His work in this field began twenty three years ago with Dr Joseph C Aub, and they established some standards of basal metabolism based on body surface area. Receiving further stimuli from problems in air-conditioning and malaria therapy, the Russell Sage investigators six years ago decided to limit their field to the study of heat loss.

Dr DuBois presented lantern slide charts to show a normal twenty-four hour curve of heat production and loss. On waking in the morning, one's heat loss is almost equal to one's heat production, both being at a low level. The subject of the experiment took a short run, the heat production curve went up steeply but the heat loss curve lagged far behind, which meant that heat was being stored. The subject returned to rest and to take a cold shower, whereupon the loss of body heat became much greater than its production. When the subject went to bed at night, the curves gradually dropped to the equal low level at the start of the experiment.

The process was described as a balanced scale, with the pointer representing body temperature at 37°C. Heat loss, on a foundation of radiation, convection and vaporization, is favored by such factors as a cooler environment, increased skin circulation and an increase in sweating and panting, which will swing the balance toward lower temperatures. On the other side of the scale is heat production, based on fundamental oxidation of carbohydrate, fat and protein, and made variable by excitement, exercise, increased basal metabolic rate, and so on, and tending to move the pointer toward higher temperatures.

The factors involved in loss of body heat can be divided into physical and physiological ones. In considering the physical factors, it should be appreciated that man's specific heat being 0.82, which is lower than that of water, a temperature rise of 1°C in a 70-kg man requires the addition to the body of 57 calories. The skin has extraordinary heat insulating properties, compared with the conduction value of cork, which is 0.0007, epidermis, muscle and fat have values from 0.00047 to 0.00050. Man, in addition, has the power of changing the properties of his skin. A 70-kg man has 1.8 square meters of surface area and a temperature gradient from within outward of 1.8°C to 10 cm in depth. The skin is a 99 per cent perfect black body radiator, there being not much difference between the skins of Negroes and Whites. The amount of moisture exuded is also a factor.

The physiological factors deal with the vascular, nervous and endocrine systems. Blood flow from within outward transports heat to the surface. Over the veins one can detect colder streaks moving inward. The body is particularly able to control heat production and dissipation, and the amount of moisture in the skin. The skin is extremely sensitive to temperature changes. For example, the skin of the forehead has been found able to detect within two or three seconds a temperature change of 0.003°C.

Dr DuBois then took time to review briefly the literature on the subject to show how the study depended on the development of measuring instruments for determining values of heat loss by radiation, convection and vaporization. These are governed by physical laws. At the start of the work, he had difficulty in measuring convection, and Dr James G Hardy, a physicist was asked to

contribute his efforts. Dr. Hardy invented the radiometer, which Dr. DuBois proceeded to describe. It measures radiation heat, which comes in the 5 to 20  $\mu$  wavelength zone, and also skin temperatures, since the skin is almost a perfect black body radiator.

In 1934 Dr. DuBois began experiments with the purpose of reducing variables to a minimum value. This required the accumulation of data on many people as subjects. He described the procedure in obtaining these readings before giving the results obtained. The remainder of his presentation consisted of the results of such experiments.

It was found that at an environmental temperature of 22°C the feet were much colder than the head and the toes even colder than the air. The toes are good heat dissipators by their surface area and sweating, and they are a long distance from the central heating. However, as the room temperature warmed toward 35°C, these areas more nearly approached each other in warmth, the greatest rise in temperature being in the feet and toes.

The breaking down of data obtained in a series of such experiments into components of radiation, convection and vaporization, revealed that with a change in temperature from 20 to 35°C the amount of heat loss by radiation declined to zero, as did the amount by convection, but not so regularly, and that heat loss by vaporization increased. The region of balance was at 28 to 30°C, this can be called the "comfort zone," in which heat loss equals heat production and the body is easily able to control loss by means of its vasomotor apparatus. At the 22°C end of the scale, heat loss is much greater than heat production, and what the body can do in the way of reducing vaporization to a minimum still is not enough, since radiation and convection are beyond control at this point. At the warmer end of the scale, heat loss is a little greater than heat production, on account of a temporary overcompensation by vaporization.

A comparison of men and women reveals the interesting fact that in men heat production is relatively constant, though heat loss may change, whereas in women at air temperatures of 28 to 36°C the rate of heat production seems to parallel closely the rate of heat loss.

Further experiments studied work, malarial chills and the use of a fan. During a chill, the rate of heat production goes up. A fan turned on the subject in a room as warm as himself will make him feel more comfortable, although actually the components of heat loss do not change their values at all!

Dr. DuBois concluded by describing what goes on in a game of squash racquets. During the game, heat production rises tremendously and the rectal temperature of the contestant goes from 37 to 39°C, however, the temperature of the skin falls. The value for radiation goes down, that for convection rises moderately, heat loss by vaporization is tremendously increased and remains high during the after game rest period. Thirty six minutes after the game ends, the rectal temperature is back to normal and the skin temperature rises from its low level. This proves that excess heat is lost from a cool skin rather than from a warm one.

Dr. DuBois illustrated dramatically the curves made by heat production and heat dissipation during and after this game of squash. Heat production during violent exercise rises in the direction of carbohydrate metabolism faster than heat loss rises in the direction of vaporization, and during the rest period following falls back to normal faster than does heat loss.

## NOTICES

### TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10 00 to 12 30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium or high-voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

### JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Dr. A. A. Berg, of the Mount Sinai Hospital, New York City, will discuss "The Surgical Aspects in the Management of Ulcerative Colitis" on Tuesday morning, May 9, from 9 00 to 10 00. Dr. K. S. Andrews and Dr. Henry Lerner will discuss the secondary manifestations.

### BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, May 10, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D., *Secretary,*  
Medical Staff

### NORFOLK DISTRICT MEDICAL SOCIETY

The eighty-ninth annual meeting of the Norfolk District Medical Society will be held at the Hotel Somerset, Boston, on Wednesday, May 10.

The business meeting will begin at 6 00 p.m., dinner will be served at 6 45. Following the dinner, there will be a talk by Mr. James H. Powers, editor of foreign affairs for the *Boston Globe*, whose subject will be "American Foreign Policy Comes of Age."

DAVID D. SCANNELL, M.D., *President*  
FRANK S. CRUICKSHANK, M.D., *Secretary*

### MASSACHUSETTS ITALIAN MEDICAL SOCIETY

The regular meeting of the Massachusetts Italian Medical Society will be held at the Hotel Kenmore, Boston, on Friday evening, May 26, at 9 00. Dr. Elliott C. Cutler will speak on Biliary Surgery. Including diagnosis and treatment.

A general discussion will follow. The medical profession is cordially invited to attend.

CARL F. MARALDI, M.D., *Secretary*

### NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The eleventh annual spring meeting of the New England Obstetrical and Gynecological Society will be held in Portland, Maine, on Wednesday, May 24.

### NATIONAL HOSPITAL DAY

National Hospital Day will again be observed in all the New England hospitals on Friday, May 12. Open house will be observed in some hospitals, while special programs

and exhibits will be put on by others. The committee for New England consists of the National Hospital Day armmen from each of the New England states. Radio programs have been arranged through Stations EEL, WAAB, and WCOP, as follows:

May 10 9 30 a. m. Station WAAB. A round table discussion by Dr. Warren Cook, superintendent of the New England Deaconess Hospital, and Dr. Joseph P. Leone, superintendent of the Quincy City Hospital and chairman of National Hospital Day for Massachusetts and New England, under the auspices of the Massachusetts Department of Public Health.

Topic "The Community Hospital and National Hospital Day"

May 11 7 00-7 30 p. m. Station WCOP. A round table discussion by the state chairmen from all the New England states.

Topic "The Modern Hospital"

May 12 4 00 p. m. Station WEEI. National Hospital Day

Speakers: Mr. Edward Dana, director of Associated Hospital Service Corporation of Massachusetts, and Dr. Charles Wilinsky, director of the Beth Israel Hospital.

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MAY 8

#### TUESDAY MAY 9

- \*9 10 a. m. Ulcerative Colitis. Dr. A. A. Berg, Dr. K. S. Andrews and Dr. Henry Lerner. Joseph H. Pratt Diagnostic Hospital.
- 10 a. m. 12 30 p. m. Tumor clinic. Boston Dispensary.

#### WEDNESDAY MAY 10

- 9 10 a. m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
- 12 m. Clinicopathological conference. Children's Hospital amphitheater.
- 1 p. m. Monthly clinicopathological conference. Boston City Hospital Pathological amphitheater.
- 6 p. m. Norfolk District Medical Society. Hotel Somerset, Boston.

#### THURSDAY MAY 11

- \*9 10 a. m. Macrocytic Anemia and Liver Therapy. Dr. W. P. Murphy. Joseph H. Pratt Diagnostic Hospital.

#### FRIDAY MAY 12

- National Hospital Day.
- 9 10 a. m. Medical Aids to Crime Detection. Dr. E. V. Hill. Joseph H. Pratt Diagnostic Hospital.
- 10 a. m. 12 30 p. m. Tumor clinic. Boston Dispensary.
- 1 p. m. Clinical meeting of the Children's Medical Service. Massachusetts General Hospital. Ether Dome.

#### SATURDAY MAY 13

- 9 10 a. m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
- 10 a. m. 12 m. Staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

Open to the medical profession.

- May 7 — Health Lecture. Quincy City Hospital. Page 636. Issue of February 23.
- May 7-15 — International Congress of Military Medicine and Pharmacy. Page 501. Issue of September 29.
- May 9 — Joseph H. Pratt Diagnostic Hospital. Page 768.
- May 10 — Monthly clinicopathological conference, Boston City Hospital. Page 763.
- May 11 — Pentucket Association of Physicians. 8 30 p. m. Hotel Bardett, 10 Main Street, Haverhill.
- May 12 — National Hospital Day. Page 768.
- May 12 and 13 — American Heart Association. Page 547. Issue of March 23.

May 13-16 — American Board of Obstetrics and Gynecology. Page 457. Issue of March 9.

May 14-20 — American Physicians Art Association. Page 404. Issue of March 2.

May 15-19 — American Medical Association. St. Louis, Missouri.

May 22, 23, and 24 — American Association for the Study of Gonorrhea. Page 405. Issue of March 2.

May 24 — New England Obstetrical and Gynecological Society. Page 766.

May 26 — Massachusetts Italian Medical Society. Page 768.

June 5, 6, 7, and 8 — American Association of Industrial Physicians and Surgeons. Page 581. Issue of March 30.

June 6, 7, and 8 — Massachusetts Medical Society. Worcester.

June 12-17 — Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 125. Issue of January 19.

June 26-29 — National Tuberculosis Association. Page 936. Issue of December 8.

September — Boston Psychoanalytic Institute. Page 450. Issue of September 22.

September 11-15 — American Congress on Obstetrics and Gynecology. Page 938. Issue of December 8.

September 15-28 — Pan Pacific Surgical Association. Page 863. Issue of November 24.

October 23, November 3 — New York Academy of Medicine. Page 581. Issue of March 30.

Fall 1939 — Temperature Symposium. Page 218. Issue of February 2.

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH

May 10 — Page 649. Issue of April 13.

### NORFOLK

May 10 — Page 768.

### WORCESTER

May 10 — Worcester Country Club — annual meeting.

## BOOKS RECEIVED FOR REVIEW

*You Can't Eat That!* A manual and recipe book for those who suffer either acutely or mildly (and perhaps unconsciously) from food allergy. Helen Morgan. 330 pp. New York: Harcourt, Brace & Co., 1939. \$2.50.

*The Principles and Practice of Ophthalmic Surgery*. Edmund B. Spaeth. 835 pp. Philadelphia: Lea & Febiger, 1939. \$10.00.

*The Circulation of the Brain and Spinal Cord. A symposium on blood supply*. The proceedings of the Association for Research in Nervous and Mental Disease, New York, December 27 and 28, 1937. 790 pp. Baltimore: Williams & Wilkins Co., 1938. \$10.00.

*Failure of the Circulation*. Tinsley R. Harrison. 502 pp. Baltimore: The Williams & Wilkins Co., 1939. \$4.50.

*The Clinical Diagnosis of Swellings*. C. E. Corrigan. 313 pp. Baltimore: The Williams & Wilkins Co., 1939. \$4.00.

*Thus We Are Men*. Walter Langdon Brown. 344 pp. New York: Longmans, Green & Co., 1939. \$3.50.

*Holmes of the Breakfast-Table*. M. A. D. Howe. 171 pp. London and New York: Oxford University Press, 1939. \$2.50.

*Traite de Biocolloïdologie*. Tome V. *État Colloïdal et Médecine*. Fascicule 1. *Le Sang*. W. Kopaczewski. 151 pp. Paris: Gauthier-Villars, 1937. 60 Fr. fr.

*Traite de Biocolloïdologie*. Tome V. *État Colloïdal et Médecine*. Fascicule 2. *Liquides et Tissus Organiques*. W. Kopaczewski. 299 pp. Paris: Gauthier-Villars, 1938. 100 Fr. fr.

*Sleep Your Life's One Third*. Maurice Chideckel. 183 pp. New York: The Saravani House, 1939. \$2.00.

*Preliminary Medicine. Preliminary states and prevention of disease*. Malford W. Thewlis. 223 pp. Baltimore: The Williams & Wilkins Co., 1939. \$3.00.

*Hypertension and Nephritis*. Arthur M. Fishberg. Fourth edition, thoroughly revised. 779 pp. Philadelphia: Lea & Febiger, 1939. \$7.50.

*Manual of Toxicology* Forrest R Davison 241 pp  
New York Paul B Hoeber, Inc., 1939 \$2 50

*Community Health Organization A manual of administration and procedure primarily for urban cases* Edited by Ira V Hiscock Third edition 318 pp New York The Commonwealth Fund, 1939 \$2 50

*Les Calculs de l'Uretere* Pierre Macquet. 186 pp  
Paris Masson et Cie, 1939 45 Fr fr

*Les Erreurs et les Fautes en Urologie* L Strominger  
176 pp Paris Masson et Cie, 1939 45 Fr fr

*Actualites Medico-Chirurgicales* Par les chefs de clinique de la Faculte de Medecine de Marseille Quatrieme serie. 192 pp Paris Masson et Cie, 1939 30 Fr fr

*Studies on Pain Conduction in the Trigeminal Nerve A contribution to the surgical treatment of facial pain* Olot Sjoqvist 139 pp New York G E Stechert & Co, 1938 \$3 00

*Angina Pectoris Nerve pathways physiology, symptomatology and treatment* Heyman R. Miller 275 pp  
Baltimore The Williams & Wilkins Co, 1939 \$3 25

## BOOK REVIEWS

*Drug Addicts Are Human Beings The story of our billion dollar drug racket—how we created it and how we can wipe it out* Henry S Williams 273 pp  
Washington Shaw Publishing Co, 1938 \$2 50

Probably most people who read this book will be surprised to learn the estimated number of morphine addicts in the United States and the number of reputable physicians who have been imprisoned or have paid fines because of convictions in courts for the alleged illegal treatment of these addicts.

One rarely finds a more zealous enterprise to bring about a reform than that shown in this volume where the author tries to convince doctors that the victims of the morphine habit are sick persons worthy of medical treatment. He also tries to teach lawyers and judges that the Harrison Narcotic Act has been misunderstood and misapplied by agents of the Narcotic Bureau in dealing with the problems involved in the medical care of addicts.

Quotations of decisions of the Supreme Court of the United States are presented and show that the Harrison Narcotic Act as drawn and amended is a revenue measure only, and that nothing in the law justifies the prosecution of reputable physicians who have treated morphine addicts. The assumption of certain judges and lawyers that the regulations of the Narcotic Bureau with respect to prescribing appropriate doses of morphine to addicts outside of jails and government hospitals has the force of law is also found to be unsound. This interpretation of the regulations has led to the closing of well-organized clinics served by well-qualified doctors, and the imposition of fines and jail sentences on many reputable physicians. Because of these court actions, doctors have declined to treat these addicts, with the result that these unfortunate people have been led to deal with the dope peddlers and thus there has been established the so-called billion-dollar racket.

The purveyors of the drug charge a dollar or more for a grain of morphine, whereas when the drug is dispensed under medical care the price is only a few cents. This deplorable situation prevents the effective treatment of ambulatory addicts and perpetuates the racket under properly regulated medical treatment the peddler would go out of business.

The Narcotic Bureau seems to have found it easier to convict a doctor even if he prescribed properly regulated

doses for an addict than to eliminate the peddler. According to Dr Williams it seems to be more gratifying for the bureau to prosecute a doctor than to deal with the real criminal. The situation seems to have changed for the better since the action of two federal judges as detailed in this book, who, after careful study of the situation, have rendered decisions to the effect that there is no legal justification for the prosecution of doctors who have treated morphine addicts with the purpose of meeting the medical problems involved. With these two decisions the author contends that a logical method of dealing with the situation will be brought about which will return the addict to medical care and the peddler will be deprived of his income and return from the field. This may be utopian, but the arguments advanced are interesting.

The author does not hesitate to use sarcasm of a high order in his vigorous denunciation of mistaken policies of the Narcotic Bureau and the methods employed by its officials. The book is well written, contains much information and the arguments seem to be sound.

With the facts before the public the question arises as to the position of organized medicine in efforts to have abuses eliminated and logical procedures adopted.

*Classic Descriptions of Disease With biographical sketches of the authors* Ralph H Major Second edition. 727 pp Springfield, Illinois, and Baltimore Charles C Thomas, 1939 \$5 50

This well known book was first issued in 1932 and had a wide circulation. It was deservedly popular for nothing of its type was available in English. At the time it was issued, the book was criticized on the basis of its incompleteness and the numerous mistakes in dates and sometimes actually in text. With the new edition, the author has not only revised his texts but he has carefully checked dates and references. In many places, moreover, the translations have been improved, although occasionally they leave something to be desired. The principal change in the second edition, however, is the added material. For this, every student of the history of medicine will be grateful. There are new sections on malaria and yellow fever. The biographical sketches have, in part, been rewritten and the index completely revised. This edition can be more highly recommended than the first.

*Hygiene Manual of public health* J R Currie. 324 pp  
Baltimore William Wood & Co, 1938 \$5 00

Although this book is designed for the instruction of medical students, practitioners interested in personal and public hygiene will find useful information in every chapter.

Beginning with a brief account of the early efforts to interest people in the underlying principles relating to personal and community health, the subsequent chapters explain hereditary and environmental factors which affect the well being of the human race. The details of the public health administration of Great Britain are set forth. Chapters devoted to the etiology and treatment of infections and communicable diseases are well written and will be useful for reference. That part devoted to the poison gases used in warfare, with precautions to be observed, are timely under existing conditions on the other side of the ocean.

The author is an authority on public health administration and has written a book which is worthy of a place in the doctor's library.



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## THE JOSEPH H PRATT DIAGNOSTIC HOSPITAL

SAMUEL PROGER, M.D.\*

BOSTON

IF THE Joseph H Pratt Diagnostic Hospital in Boston simply added a few beds to those already available in New England for medical care, it would hardly justify itself. It has been constructed with the idea that as the focal point in a broad program for the better distribution of medical care it can serve a unique and useful purpose in New England medicine. A description of the planned functions of the hospital then resolves itself into a description of this broad program for the advancement of medicine, particularly in non-metropolitan areas, to which end the Bingham Associates Fund has devoted itself for some seven years.

The Joseph H Pratt Diagnostic Hospital, like the program to which it is dedicated, represents the humanitarianism of William Bingham, 2nd, a real philanthropist. The Bingham Associates Fund, through which the hospital and program have been made possible, was under the supervision of Dr. John G. Gehring, its first president, from 1931 to 1933. During the last six years (since Dr. Gehring's death) the Fund has been under the active, far-sighted direction of Dr. George B. Farnsworth, its second president.

The general aim is essentially that described by Dr. Joseph H. Pratt<sup>1</sup> in 1932, to which reference is made in *The Final Report of the Committee on the Costs of Medical Care*,<sup>2</sup> as follows: "An arrangement embodying some of the relations between branches and medical centers here proposed has been effected between the New England Medical Center in Boston and the Rumford (Maine) Community Hospital. It is described by Dr. Joseph H. Pratt. It is largely in recognition of this pioneer work that the hospital bears its name."

### PLANNED PROGRAM AND GENERAL PROBLEM

The plan of the Bingham Associates Fund is designed to extend into small communities the medical advantages of a metropolitan center by

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direct and indirect contacts between these elements, arranged on a permanent working basis. It is intended that small communities shall maintain their opportunities for independent work, but that it shall be integrated with that of larger centers.

Unquestionably many of the benefits of medical advances ultimately reach small communities under almost any circumstances. At present, however, this dissemination is haphazard, irregular and slow. It is our hope to establish regular and directed channels for the transmission of medical developments. Accordingly, through hospital centers of various gradations, a model has been set up which involves the Tufts College Medical School and New England Medical Center in Boston as its central medical-school-hospital base, the Central Maine General Hospital in Lewiston, Maine, as its regional center, and community hospitals in Bath, Brunswick, Rockland, Augusta, Rumford and Skowhegan as its smaller affiliated units. The latter hospitals are within eighty miles of Lewiston and are easily accessible by train or automobile.

A regional center similar to the one in Lewiston is being established in Bangor at the Eastern Maine General Hospital for the purpose of offering direct aid to a group of small hospitals in the northeastern part of Maine. This, like the already established group, is intended as a model to serve as a basis for further development.

The plan of establishing graded centers (university-hospital medical center, regional centers and community hospitals) has proved effective. Such an arrangement tends to enable the units, which are graduated according to size and location, to be mutually stimulating. When, on the other hand, a direct association is attempted between hospitals too distant from one another and varying too greatly in size, equipment and facilities, the relation becomes one of dependence on the part of the smaller unit, and impersonal and disinterested help on the part of the larger one.

*Manual of Toxicology*. By R. Davis. 2-1 pp. New York: Paul S. Hoeber, Inc., 1934. \$2.51.

*Concurrent Health Organization: A manual of administration and procedure primarily for urban areas*. Edited by Dr. W. Black. Third edition. 315 pp. New York: The Commonwealth Fund, 1933. \$2.51.

*Les Calculs de l'Urethre*. By Pierre Masson. 149 pp. Paris: Masson et Cie, 1931. 45 Fr. c.

*Les Calculs de la Vessie et de l'Urethre*. By Pierre Masson. 175 pp. Paris: Masson et Cie, 1934. 45 Fr. c.

*Annuaire Médico-Chirurgical*. Par les soins de l'Association de la Faculté de Médecine de Marseille. Quarante-septième année. 322 pp. Paris: Masson et Cie, 1933. 30 Fr. c.

*Studies on Pain Conduction in the Trigeminal Nerve: A contribution to the surgical treatment of neural pain*. By S. Sjögren. 129 pp. New York: G. B. Stewart & Co., 1933. \$3.01.

*Argentine Nervous System*. By R. Miller. 275 pp. Baltimore: The Williams & Wilkins Co., 1933. \$3.51.

## BOOK REVIEWS

*Drug Abuse at Home and Abroad*. The story of an epidemic in modern drug habits—how we reached it and how we can cope with it. By Henry S. Williams. 275 pp. Washington: Shaw Publishing Co., 1934. \$2.51.

Probably every people who read this book will be surprised to learn the estimated number of morphine addicts in the United States and the number of reputable physicians who have been imprisoned or have paid fines because of accusations or errors for the alleged illegal treatment of these addicts.

One rarely finds a more real and concrete or more about a real man than this book, in this volume where the author tries to describe doctors and the reasons of the morphine habit and seek persons worthy of medical treatment. He also tries to reach lawyers and judges and the Humanitarian Narcotic Act has been misunderstood and misapplied by agents of the Narcotic Bureau in dealing with the physicians required in the medical care of addicts.

Questions of decisions of the Supreme Court in the United States are presented and show that the Humanitarian Narcotic Act is drawn and amended as a revenue measure only and that nothing in the law forbids the possession of or regular use of morphine by addicts who are treated by doctors. The emphasis on certain judges and lawyers that the regulation of the Narcotic Bureau with respect to prescribing morphine to addicts is not a medical matter is not only a gross error but has the effect of a law as well as a fact. The author in this respect is in the right and has led to the wrong of well-regulated clinics served by well-qualified doctors and the possession of drugs and full treatment of most reputable physicians. Because of these errors many doctors have decided to treat these addicts with the result that most of these people have been led to deal with the drug peddlers and thus there has been established the so-called "black market."

The purpose of the drug traffic is to make it possible for a person to get a drug without having to go through the usual medical care and the price is not a few cents. This drug traffic is in part the effective treatment of addicts and perpetuates the addiction under proper regulated medical treatment and proper treatment of addicts.

The Narcotic Bureau seems to have decided to make it possible for a doctor even to be prosecuted for giving regulated

drugs for an addict than to eliminate the problem according to Dr. Williams it seems to be more gratifying for the Bureau to prosecute a doctor than to deal with the real problem. The situation seems to have changed for the better since the act in at two federal judges is shown in this book who after careful study of the situation have rendered decisions to the effect that there is no legal justification for the prosecution of doctors who are treated morphine addicts with the purpose of meeting the medical problems involved. With these two decisions the author avouches that a logical method of dealing with the situation will be brought about which will return the addict to medical care and the problem will be deprived of its main and centre from the field. This may be argued, but the arguments advanced are interesting.

The author does not hesitate to use sarcasm at a high level in his vigorous denunciation of mistaken policies of the Narcotic Bureau and the methods employed by its agents. The book is well written, contains much information and the arguments seem to be sound.

With the facts before the public the question arises as to the position of organized medicine in efforts to have a more efficient and logical procedures adopted.

*Classic Descriptions of Disease*. This bibliography is by the authors, Ralph H. Major. Second edition. 177 pp. Springfield, Illinois and Baltimore: Charles C. Thomas, 1933. \$2.51.

This bibliography book was first issued in 1932 and had a wide circulation. It was deservedly popular for nothing of its type was available in English. At the time it was issued the book was criticized on the basis of its incompleteness and the numerous mistakes in facts and sometimes actually in text. With the new edition the author has not only revised his text but he has carefully checked facts and references. In many places, however, the translations have been improved, although occasionally they leave something to be desired. The principal change in the second edition, however, is the added material. For this every student of the history of medicine will be grateful. There are new sections on malaria and venereal disease. The biographical sketches have in part been rewritten and the index completely revised. This edition can be more highly recommended than the first.

*Hygiene Manual of public health*. J. R. Curtis. 527 pp. Baltimore: William Wood & Co., 1933. \$5.01.

Although this book is designed for the individual and medical students, practitioners interested in personal and public hygiene will find useful information in every chapter.

Beginning with a brief account of the current status of human health in the modernizing process, the subsequent chapters explain heredity and environmental factors which affect the well-being of the human race. The subjects of the public-health administration in Great Britain are well explained devoted to the etiology and treatment of infectious and communicable diseases are well written and will be useful for reference. The part on venereal diseases is used in writing and presentation of the subject are clearly and interestingly explained on the side of the reader.

The author is an authority in many fields of medicine and has written a book which is a valuable addition to the literature of hygiene.

## DIAGNOSTIC AID

In order to carry on our program, we require a teaching and a clinical base. The Tufts College Medical School is the teaching base, the New England Medical Center and, primarily, the Joseph H Pratt Diagnostic Hospital form the clinical base. The clinical base should be not a hospital which will take over the hospital work of the affiliated communities,—this would be difficult and psychologically undesirable,—but a clearing-house for such problems as the latter, because of their limited facilities are unable to handle to the best advantage of the patients. The base hospital, then, serves as a complement to and not a substitute for the affiliated hospitals.

Unquestionably, one of the most important aids is a well-trained diagnostician. This, an institution especially devoted to diagnostic work is best able to supply. The Joseph H Pratt Diagnostic Hospital, with a large and especially trained personnel, is prepared to offer diagnostic help in the more obscure problems. Such help is available directly to the physician in the small community or through his local hospital. Patients are accepted directly from a physician in rural communities only when he believes that the local or nearby hospital facilities for study are inadequate. This decision must rest with the referring physician.

Through our schedule of undergraduate and postgraduate instruction, it is hoped that ultimately most if not all the physicians who make use of the Diagnostic Hospital will become thoroughly familiar with its work. The utilization of the hospital can serve as an effective means of continued contact with and instruction from the central institution through study of the physician's own cases. Such instruction is personal and very real, and can aid in maintaining contacts from undergraduate days through repeated postgraduate courses. In addition, the diagnostic work can serve as the dynamic force which will weld and vitalize the administrative, clinical and pedagogic aspects of the entire program. Through actual work with patients these aspects assume a more direct and tangible meaning.

It is our aim to stimulate a desire for better diagnostic work, more intelligent and efficient treatment will naturally follow. There are probably two factors which more than any others dampen the desire for professional diagnostic help: fear of the referring physician that he may be found wrong, and hence fall in the estimation of his patient, and the idea that he will lose the patient by referring him to another physician or to an institution. That such considerations should not exist is beside the point, the fact is, they do exist and

they should be recognized and arrangements made accordingly.

The policies of the hospital are designed to overcome these difficulties. For this reason, no patient is admitted unless sent by a referring physician, to whose care the patient is finally discharged. The referring physician at all times maintains complete control over the disposal of the patient. Correspondence is confined to him, and subsequent admissions can be arranged only through him. A complete report of findings, with diagnosis and recommendations, is sent to him, and as little information as possible is divulged to the patient. If the latter raises questions, as frequently happens, he is informed that his own physician will receive all the information and recommendations which we have to offer, and is told that all questions must be referred to this physician. If the hospital diagnosis and recommendations differ from those already given the patient by the referring physician, the latter is free to explain this difference as he sees fit. Essentially, the desire is to eliminate any possible factor which may influence a physician to wait until it is too late for a consultation, where he might otherwise have sought aid earlier.

Of course, no policy is justifiable which protects the physician to the detriment of the patient, and this may appear to be the case here. However, there can be no gainsaying that the relation between the doctor and the patient is a much more important one than that between an institution and the patient. On the physician falls the responsibility for putting to good use the information which the hospital can supply. The application of such information, which may involve close supervision and prolonged care, must be made as free from difficulties as possible if the patient is to receive the maximum benefit. It is the purpose of the hospital to help the patient through his physician, and to improve the practice of medicine in small communities by offering help to its physicians.

It must be emphasized that no indictment is intended of the capabilities of general practitioners. The implication is only that no physician today can be wholly self-sufficient, for the simple reason that it is humanly impossible for one person to encompass all medical knowledge.

Another factor which tends to decrease the demand for diagnostic aid is the development of a smugness and a complacency that often go with isolation and the lack of information. Our efforts at postgraduate education are designed to overcome this situation, and in a small way are successful, as is attested by the increasing number of patients referred for special studies. Education

The great advances in medicine, except for those in the field of public health, have given advantages chiefly to those practicing in metropolitan centers, where improvements have been more and more concentrated, so that finally there have developed such magnificent centers of advanced thought and practice in medicine as the Medical Center in New York City, the New York Hospital, the Lakeside Hospital and the Johns Hopkins Hospital. The influence of these institutions has gradually become greater, but relatively more concentrated, as rapid growth has occurred. The diffusion of this influence into small communities has been perhaps slower than necessary, largely because there has been no directed plan. Figuratively, as well as literally, such institutions have tended to grow into the skies. It is our purpose to direct development outward instead of upward, horizontally instead of vertically. A more or less direct means for the spread of the new developments of the metropolitan medical centers to rural communities would admittedly be desirable, and a planned program for this purpose is the essential aim of the Bingham Associates Fund.

Most plans for the improvement of rural medicine entail postgraduate instruction, subsidies to physicians in small communities, and the establishment of community hospitals or other facilities for group practice. Such plans are obviously directed toward overcoming the two major defects of rural medicine, namely inadequate local facilities and advantages, and insufficient numbers of physicians. Unfortunately, it is the general opinion that they have not been entirely successful. The principal reasons are self-evident.

Some of the problems involved in postgraduate instruction are described below. As for subsidies, it would appear that where financial backing is certain and regular, the initial problem of securing well-trained men for small communities can be thus attacked. However, if, as is apparently the case, the conditions under which practice must be carried on in small communities are so unattractive as to fail to interest young graduates, a more logical approach to the problem would seem to lie in the direction of efforts toward making such practice more attractive. Automobiles, good roads, radios and other material advantages have overcome many of the social and broader cultural handicaps once associated with life in small communities. It remains to carry corresponding medical advances into these areas, and when this has been accomplished, young physicians may be expected to settle gladly in them. It will no longer be necessary to lure them by the offer of subsidies, they will instead be attracted by the opportunity to practice medicine under conditions comparing

favorably with those in the medical centers in which they were trained.

The establishment of hospitals in rural communities is of unquestionable value, for among other things such units may offer the physical requirements for the utilization of the more modern methods of medicine. However, an expensive surgical unit does not ensure good surgery, a complete x-ray apparatus does not predicate accurate x-ray diagnosis, and a well-equipped laboratory does not guarantee scientific aid in medical management. In fact, such facilities may do more harm than good if not intelligently employed. It is only human to be lulled into false security by trusting blindly to the wisdom represented by awesome and expensive apparatus. It is natural to want to shift responsibility, and what better object can be found to which to shift it than some inanimate, unresponsive, shiny machine which is reputed to give us such and such reliable information? It is also human to have great confidence in impressive things about which we know little or nothing. A surgeon may actually be misled into a false belief in his sufficiency by the impressive display of all the modern equipment which he employs. A physician may wrongly give assurance concerning a patient's heart because "the electrocardiogram was normal," and a patient may be permitted to suffer untold mental anguish because x-rays were inaccurately interpreted as showing cancer. No medical weapons are deadlier than those of the pseudoscientist.

It is plain, then, that upon those who make modern facilities available to rural communities a great responsibility exists in assuring the proper, continued use of these facilities. It is in this latter respect that present programs for the advancement of rural medicine have not been entirely successful. If properly utilized, a community hospital can be the most effective unit in a program for the advancement of rural medicine, for it is ultimately the community hospital which will determine whether good or poor medicine is to be practiced in the community. It is therefore toward the improvement of small community hospitals that one of the principal features of our program is directed, namely the extension of services between such hospitals, larger intermediary units and a metropolitan center.

The program has three branches, each representing an approach to the general problem from another angle, the whole program being a coordinated effort toward making better medical care available to more people of New England, particularly in non-metropolitan areas. The three are as follows: diagnostic aid, hospital extension services and postgraduate education, as described below.

at least within a year after they have been instituted at the medical-school-hospital center. To the degree that supervision and instruction are essential for best results, our program for laboratory aid to small community hospitals appears to be adequate. It is significant that the supervision and instruction are given in Lewiston and Boston, and not in the community hospital. If the latter were the case, there would be a justifiable tendency to resent intrusion. During the two months when the technician is away from the community hospital, a well-trained itinerant technician serves as substitute.

The pathological service is organized in the following way. Each community hospital is expected to send all its specimens routinely to the pathologist at the Central Maine General Hospital, who sends back a report to the hospital. He also has the opportunity, in all questionable cases, of consulting with Dr. H. E. MacMahon, professor of pathology at Tufts College Medical School. In this way the latter is available to all the small hospitals on those cases in which his special knowledge is needed, whereas the routine work is adequately handled through Lewiston. The pathologist at Lewiston is also available for postmortem examinations and clinicopathological conferences at the small hospitals.

Under the arrangement for x-ray service, the radiologist at the Central Maine General Hospital visits the community hospitals one morning or afternoon each week, at which time he reviews with the local radiologist all the films of the preceding week and performs what fluoroscopies have been held over for him. He is also available at all times in Lewiston for interpretation of emergency films. We have arranged, through a fellowship, for the Lewiston radiologist to attend the weekly diagnostic x-ray conferences each Wednesday afternoon at the Massachusetts General Hospital, where he has an opportunity to present a limited number of films for group consultation. Ultimately, therefore, the community hospitals, through the Lewiston radiologist, have this Massachusetts General Hospital consultation service at their disposal. Thus, as in the pathological program, the Boston unit is utilized only where it can be most helpful, namely in unusual cases.

As to the electrocardiographic program, a course of one week's duration in the interpretation of electrocardiograms was given at the New England Medical Center to representatives of the community hospitals selected by their own groups. The course was furnished without charge on the condition that the hospital purchase an electrocardiograph. From the community hospitals the local electrocardiographer sends a copy of every

tracing to the Lewiston electrocardiographer, whose reports then become available for check by the physician in the community hospital. The tracings that are difficult to interpret are then sent from Lewiston to Boston, where several cardiologists are available for consultation when necessary. In this manner, again, the small hospitals have available the best authorities on interpretation of electrocardiograms, when and as they are needed. At the same time, the electrocardiographer of the local hospital is given constant opportunity for supervised training and improvement. It has been our impression that small community hospitals should not have an electrocardiograph unless some satisfactory arrangement is made for the intelligent interpretation of the tracings.

The method for offering aid in dietetics is similar to that described for laboratory work. Arrangements are made for the dietitian from each community hospital to spend one month each year in Boston, where she is given instruction, so that she may be kept informed of the rapid developments in this important field.

The library service is now getting under way. Every four days, each community hospital receives from the library of the regional center in Lewiston five medical journals, which are prominently displayed and remain in each hospital for four days, after which they are sent on to a neighboring hospital. During twenty-eight days of each month, each community hospital receives thirty-five medical journals. Reprints of almost all the articles can be obtained through the library at the Central Maine General Hospital, which is also equipped to supply the bibliographical material to any of the staff members of the affiliated hospitals who may wish to make a more complete review of the literature in regard to a special case or for aid in preparing a paper. The library in Lewiston, in turn, is affiliated with the Boston Medical Library, and can obtain literature on unusual subjects from the latter.

The services which we hope soon to be able to install are in nursing, administration and anesthesiology.

The details of organization of the various services are put into operation after being presented to and discussed by a committee of representatives of the hospitals involved, each being represented by a staff physician, the superintendent and a member of the lay board. This assures interested cooperation and a practical appraisal of local problems.

As indicated above, the community hospitals surrounding Lewiston are easily accessible. But this is not essential. If the community hospitals were scattered as far distant as two hundred miles from

is, among other things, a process of making clear the ever-increasing extent of our ignorance

It is said that the general practitioner can satisfactorily care for 80 or 90 per cent of his patients without the aid of a specialist. On the other hand, from 80 to 90 per cent of all illness, exclusive of the more severe neuroses, is either self-limited, relatively easily managed or unresponsive to treatment. If the practitioner can care satisfactorily for this percentage of his patients, does he? Or does any physician, for that matter? There must be a clear distinction between what *can* be done and what *is* done. A youngster with a simple sinus arrhythmia or perhaps a soft pulmonic systolic murmur does not require a specialist, in fact, he requires no physician at all. But he may be subjected to the shock of being told he has heart disease, or even of being put to bed for several months because of lack of knowledge of what he does not have, namely heart disease. There are many similar examples. We all encounter such cases frequently, and at times we are guilty of such errors. These cases are included among the patients who can be cared for by the practitioner, but they are evidently cases in which such special aid as may be given by a diagnostic hospital can be of real help. Instruction in what not to do is one of the important functions of this hospital.

Hospitals, especially in large cities, are frequently subjected to the criticism that their staffs are too restricted, or the reverse. If the restrictions are made too rigid in an attempt to maintain the highest standards of work, many physicians complain that they receive little or no help from the hospital, since they are permitted no satisfactory approach to the advantages which the institution has to offer. If, however, physicians are indiscriminately permitted on the staff, the quality of the hospital work must suffer.

We have attempted to meet this problem by permitting all licensed physicians free access to our facilities, but in the hospital the responsibility for diagnosis rests with a relatively small, full-time and specially trained staff. In this manner, a uniform and high standard of work can be maintained, which is directly available to all physicians and through them to all patients, whether they can pay at full rates, at reduced rates, or nothing, and whether they come from Massachusetts, Maine or some other part of New England.

#### HOSPITAL EXTENSION SERVICES

Experience has shown that in order to reach effectively the hospitals of small communities, an intermediary, large, central hospital within a given

wide area is of great benefit. Working directly from an area like Boston to a small community in Maine involves going over the heads of large hospitals such as the Maine General Hospital in Portland, the Central Maine General Hospital in Lewiston and the Eastern Maine General Hospital in Bangor. A system of direct co-operation between a large center, such as Boston, and a small community in another state also has the disadvantage of a certain amount of awkwardness inherent in the problem of widely separated localities. Quick and ready co-operation between such widely separated points becomes difficult. On the other hand, with the establishment of intermediary centers within the state in question, this difficulty is overcome. We have, therefore, as already indicated, set up a direct line of activity from Boston through regional centers to the small community hospitals within easy reach of them. Such a plan, since it tends to bring into a single working scheme the centers of varying sizes within the state, also avoids the fault of setting up justifiable antagonism by those connected with the larger centers—antagonisms that might develop should direct approach be made from an outside metropolitan center to the small communities. In general, where there has been an active desire to aid small communities, the assistance of larger but more or less local centers has not been sufficiently utilized.

The manner in which these hospitals of various sizes become effective co-operating units can best be described by a brief résumé of our present program of extension services in the fields of laboratory work, radiology, pathology, electrocardiography, dietetics and library assistance.

Technicians in small community hospitals generally work without supervision and have no stimulating contacts in their own field of work. Under these circumstances, and after long-continued isolation, it is only natural that the quality of their work should suffer, and obviously they are not likely to be well informed concerning constantly developing new tests and methods. Designed to meet this need, our laboratory program operates as follows. The technician in each community hospital spends one month of each year in the Central Maine General Hospital in Lewiston, performing routine laboratory duties under the active supervision of a full-time pathologist. Another month each year is spent in the laboratories of the Tufts College Medical School and New England Medical Center, where instruction is given in new methods and procedures, and where technique is further improved. It thus becomes possible for the community hospitals affiliated in our program to employ the newest laboratory tests and technique.

Unquestionably, a short period of postgraduate study can be very stimulating and informative. However, if there is no continued contact between the student and the teaching institution, it is inevitable that the former soon drifts back to his previous habits of thought and action. This is especially true when, as so often happens, postgraduate instruction serves simply to emphasize the inadequacies of the student's local facilities for practice, inadequacies about which he can do nothing. Factual medical information is so vast that the acquiring of a few facts in a short period can hardly be of great value. Such static training is as evanescent as the very "facts" which it imparts.

This situation, which represents one of the defects in the program of most teaching institutions, may be regarded as one of the fundamental factors to be taken into consideration in the planning of any program of postgraduate instruction. The program must provide for "dynamic" instruction which means essentially repeated and continued instruction. Postgraduate instruction is thought to be necessary for the very reason that medical knowledge is not stationary, and that the training acquired in the medical school constitutes little more than a preliminary grounding in the principles of medicine and in habits of thought. A single or occasional postgraduate course would have the same inherent defects, and more strikingly so, as has the regular course in medicine each would offer only a temporary and fixed picture of medicine, when as a matter of fact the problems of medicine are notably neither temporary nor fixed. In the planning of our program, this factor has been duly considered, as already indicated, and it is our purpose more and more to increase the opportunities for continual instruction.

A second basic fact to be considered in planning postgraduate instruction in a teaching institution, a fact which has also too often been disregarded, is that the attitude of the practicing physician toward an institution of learning is entirely different from that of an undergraduate. The latter is forced willy-nilly to apply himself to an intensive program of education, else he must abandon his profession and his choice of a means of livelihood. Under these circumstances, he must study, because he must pass certain requirements. The practitioner, on the other hand, is not so unhappily situated. Only his own desire for knowledge prompts him to take advantage of opportunities for postgraduate instruction and once he becomes a postgraduate student, only the intensity of this desire will influence the serious-

ness with which he applies himself to a period of self-improvement.

Apparently, there are relatively few who are inherently eager for education except as a means to an end, and where no strong outside stimulus exists, a large number of practitioners cannot be expected to seek instruction of a more general character, by this is meant instruction which does not directly and obviously lead to new opportunities for increasing revenue from practice. A physician may, for example, spend a week taking a course in electrocardiography in preference to a general course in cardiology, because the former offers a more definite means of earning money than does the latter. The desire to better oneself financially is probably at least as strong and as widespread as the urge for educational improvement. The economic is at least as great as the moral drive.

So long as a physician's livelihood depends on the practice of medicine, just so long will financial considerations play a part in many aspects of his work. This is inevitable and cannot be condemned, unless the practitioner is freed from financial cares. This fact must be recognized and its implications used as a guide to the practical arrangement of work.

At this point, it may be well to direct attention to certain other problems which arise when teaching of practicing physicians is done, as is so often the case, in an institution where the primary emphasis is on the routine care of cases, the secondary emphasis on instruction for undergraduates, and the least emphasis on instruction for postgraduates. Too often graduates are made to feel that their courses are comparatively unimportant so far as the school or hospital is concerned, and they may leave as much strangers to the institution and with as little knowledge of it as when they arrived. This situation we have made a sincere effort to overcome. We have arranged the postgraduate student's work so that it is integrated with that of the institution. He becomes a part of our organization and is so treated by the staff and instructors. Under such conditions, we have found that our approach is decidedly easier and more effective. This feature of our teaching is now even more pronounced, since the postgraduate students live in the resident quarters on the hospital grounds.

In addition to making the postgraduate student throughout his stay with us an important and integral part of our organization, we have emphasized, as an aid to more effective teaching, an informal approach. During only one hour of the daily eight-hour schedule is he subjected to a tor-

the subsidiary center, it would be necessary to alter our present arrangements only so far as they concern the x-ray program. In fact, such a modified plan is at present being developed in Bangor, where the Eastern Maine General Hospital will serve as the regional center to several affiliated hospitals in northern Maine.

It is clear that the medical-school-hospital center is utilized only to the extent to which it can give special aid to the regional center and community hospital. For example, by employing the professor of pathology at Tufts College Medical School only in cases where his special knowledge is required, we can supply to each of the six community hospitals around Lewiston the fullest benefit of his experience, yet in the course of a year he would be required to devote no more time to the Lewiston and the six community hospitals than would be demanded were he to offer a full service to only one of them. Where the community hospitals have had no pathologist because they could not afford one, they now have, in effect, two—in Lewiston and in Boston. And whereas the pathologist in the regional center has had less work than he could comfortably handle, and unsatisfactory opportunities for the stimulating association with an academic center, he now has greater material to work with and regular channels for academic contacts. To the extent that the regional center can carry on its own work, therefore, it is given the fullest stimulation and help.

The program is intended to make possible more and better medical work by physicians in smaller communities. It is not intended to stimulate these physicians to send more patients to metropolitan centers. As an example, instead of urging that a patient on whom an electrocardiogram might be desired be sent from a small community to a large center where such a tracing could be better interpreted we urge that electrocardiograms be made in the small communities, but under conditions that compare favorably with those in the large center. It is our purpose, in the case of community hospitals, not to take over their activities, but to make it possible for them to utilize more effectively what services they already offer and to supply additional services under the most favorable circumstances.

#### POSTGRADUATE INSTRUCTION

It is clear that a program which offers opportunities for the fullest effective utilization of technical facilities of hospitals of various sizes and does nothing to make possible the intelligent utilization of those facilities by the physicians is unbalanced. Hence the obvious need for postgraduate

instruction to practicing physicians, which naturally represents a major aspect of our undertaking.

The ultimate adequacy of the medical care which can be made available to the majority of the people of this country will be a measure of the adequacy of the physician who administers that care, namely the general practitioner. All plans, therefore, aiming to provide the best medical care should concern themselves with the problem of improving the capabilities and the adequacy of those who are to supply that care, namely with postgraduate education.

The problems of graduate and postgraduate instruction have received much attention, both here and abroad. As applied to practicing physicians, such instruction in general concerns itself with the training of specialists or the giving of "refresher" courses for general practitioners. Our present interest is confined to the latter type of instruction, and more particularly as concerns practitioners in relatively small communities. To such physicians, instruction may be supplied through meetings which they organize and conduct, clinics conducted by well-qualified guest physicians (medical society meetings may also be placed in this category), and courses given in a recognized academic institution.

Our experience indicates that a well rounded program should include some of each of these forms of instruction, since no one alone appears self-sufficient and satisfying. Unquestionably, each has real value. In addition to offering aid in the first two kinds of instruction, as a result of which we are enabled to maintain continued academic contact with most of our postgraduate students, we have for several years given at the New England Medical Center, through Tufts College Medical School, courses of one month's duration covering the general aspects of medicine. The course is specifically designed for general practitioners. During the past year, courses have been instituted in obstetrics and gynecology and in pediatrics. These also are of one month's duration.

Because it is recognized by the Bingham Associates Fund that the burden of the cost of postgraduate instruction is too great for many general practitioners, fellowships are offered for the one month courses at the New England Medical Center, carrying a stipendium of \$250, and there is no tuition fee. These fellowships have as yet been offered only in Maine. In addition, shorter courses of one week's duration are now given in such more limited fields as allergy, gastroenterology, endocrinology and cardiology. For these, no tuition fee is charged to the physicians of Maine, to other physicians, the charge is nominal.



Unquestionably, a short period of postgraduate study can be very stimulating and informative. However, if there is no continued contact between the student and the teaching institution, it is inevitable that the former soon drifts back to his previous habits of thought and action. This is especially true when, as so often happens, postgraduate instruction serves simply to emphasize the inadequacies of the student's local facilities for practice, inadequacies about which he can do nothing. Factual medical information is so vast that the acquiring of a few facts in a short period can hardly be of great value. Such static training is as evanescent as the very "facts" which it imparts.

This situation, which represents one of the defects in the program of most teaching institutions, may be regarded as one of the fundamental factors to be taken into consideration in the planning of any program of postgraduate instruction. The program must provide for "dynamic" instruction, which means essentially repeated and continued instruction. Postgraduate instruction is thought to be necessary for the very reason that medical knowledge is not stationary, and that the training acquired in the medical school constitutes little more than a preliminary grounding in the principles of medicine and in habits of thought. A single or occasional postgraduate course would have the same inherent defects, and more strikingly so, as has the regular course in medicine: each would offer only a temporary and fixed picture of medicine, when as a matter of fact the problems of medicine are notably neither temporary nor fixed. In the planning of our program, this factor has been duly considered, as already indicated, and it is our purpose more and more to increase the opportunities for continual instruction.

A second basic fact to be considered in planning postgraduate instruction in a teaching institution, a fact which has also too often been disregarded, is that the attitude of the practicing physician toward an institution of learning is entirely different from that of an undergraduate. The latter is forced willy-nilly to apply himself to an intensive program of education, else he must abandon his profession and his choice of a means of livelihood. Under these circumstances, he must study, because he must pass certain requirements. The practitioner, on the other hand, is not so unhappily situated. Only his own desire for knowledge prompts him to take advantage of opportunities for postgraduate instruction, and once he becomes a postgraduate student, only the intensity of this desire will influence the serious-

ness with which he applies himself to a period of self-improvement.

Apparently, there are relatively few who are inherently eager for education except as a means to an end, and where no strong outside stimulus exists, a large number of practitioners cannot be expected to seek instruction of a more general character, by this is meant instruction which does not directly and obviously lead to new opportunities for increasing revenue from practice. A physician may, for example, spend a week taking a course in electrocardiography in preference to a general course in cardiology, because the former offers a more definite means of earning money than does the latter. The desire to better oneself financially is probably at least as strong and as widespread as the urge for educational improvement. The economic is at least as great as the moral drive.

So long as a physician's livelihood depends on the practice of medicine, just so long will financial considerations play a part in many aspects of his work. This is inevitable and cannot be condemned, unless the practitioner is freed from financial cares. This fact must be recognized and its implications used as a guide to the practical arrangement of work.

At this point, it may be well to direct attention to certain other problems which arise when teaching of practicing physicians is done, as is so often the case, in an institution where the primary emphasis is on the routine care of cases, the secondary emphasis on instruction for undergraduates, and the least emphasis on instruction for postgraduates. Too often graduates are made to feel that their courses are comparatively unimportant so far as the school or hospital is concerned, and they may leave as much strangers to the institution and with as little knowledge of it as when they arrived. This situation we have made a sincere effort to overcome. We have arranged the postgraduate student's work so that it is integrated with that of the institution. He becomes a part of our organization and is so treated by the staff and instructors. Under such conditions, we have found that our approach is decidedly easier and more effective. This feature of our teaching is now even more pronounced, since the postgraduate students live in the resident quarters on the hospital grounds.

In addition to making the postgraduate student throughout his stay with us an important and integral part of our organization, we have emphasized, as an aid to more effective teaching, an informal approach. During only one hour of the daily eight-hour schedule is he subjected to a for-

the subsidiary center, it would be necessary to alter our present arrangements only so far as they concern the x-ray program. In fact, such a modified plan is at present being developed in Bangor, where the Eastern Maine General Hospital will serve as the regional center to several affiliated hospitals in northern Maine.

It is clear that the medical-school-hospital center is utilized only to the extent to which it can give special aid to the regional center and community hospital. For example, by employing the professor of pathology at Tufts College Medical School only in cases where his special knowledge is required, we can supply to each of the six community hospitals around Lewiston the fullest benefit of his experience, yet in the course of a year he would be required to devote no more time to the Lewiston and the six community hospitals than would be demanded were he to offer a full service to only one of them. Where the community hospitals have had no pathologist because they could not afford one, they now have, in effect, two—in Lewiston and in Boston. And whereas the pathologist in the regional center has had less work than he could comfortably handle, and unsatisfactory opportunities for the stimulating association with an academic center, he now has greater material to work with and regular channels for academic contacts. To the extent that the regional center can carry on its own work, therefore, it is given the fullest stimulation and help.

The program is intended to make possible more and better medical work by physicians in smaller communities. It is not intended to stimulate these physicians to send more patients to metropolitan centers. As an example, instead of urging that a patient on whom an electrocardiogram might be desired be sent from a small community to a large center where such a tracing could be better interpreted we urge that electrocardiograms be made in the small communities, but under conditions that compare favorably with those in the large center. It is our purpose, in the case of community hospitals, not to take over their activities, but to make it possible for them to utilize more effectively what services they already offer and to supply additional services under the most favorable circumstances.

#### POSTGRADUATE INSTRUCTION

It is clear that a program which offers opportunities for the fullest effective utilization of technical facilities of hospitals of various sizes and does nothing to make possible the intelligent utilization of those facilities by the physicians is unbalanced. Hence the obvious need for postgraduate

instruction to practicing physicians, which naturally represents a major aspect of our undertaking.

The ultimate adequacy of the medical care which can be made available to the majority of the people of this country will be a measure of the adequacy of the physician who administers that care, namely the general practitioner. All plans, therefore, aiming to provide the best medical care should concern themselves with the problem of improving the capabilities and the adequacy of those who are to supply that care, namely with postgraduate education.

The problems of graduate and postgraduate instruction have received much attention, both here and abroad. As applied to practicing physicians, such instruction in general concerns itself with the training of specialists or the giving of "refresher" courses for general practitioners. Our present interest is confined to the latter type of instruction, and more particularly as concerns practitioners in relatively small communities. To such physicians, instruction may be supplied through meetings which they organize and conduct, clinics conducted by well-qualified guest physicians (medical society meetings may also be placed in this category), and courses given in a recognized academic institution.

Our experience indicates that a well rounded program should include some of each of these forms of instruction, since no one alone appears self-sufficient and satisfying. Unquestionably, each has real value. In addition to offering aid in the first two kinds of instruction, as a result of which we are enabled to maintain continued academic contact with most of our postgraduate students, we have for several years given at the New England Medical Center, through Tufts College Medical School, courses of one month's duration covering the general aspects of medicine. The course is specifically designed for general practitioners. During the past year, courses have been instituted in obstetrics and gynecology and in pediatrics. These also are of one month's duration.

Because it is recognized by the Bingham Associates Fund that the burden of the cost of postgraduate instruction is too great for many general practitioners, fellowships are offered for the one month courses at the New England Medical Center, carrying a stipendium of \$250, and there is no tuition fee. These fellowships have as yet been offered only in Maine. In addition, shorter courses of one week's duration are now given in such more limited fields as allergy, gastroenterology, endocrinology and cardiology. For these, no tuition fee is charged to the physicians of Maine, to other physicians, the charge is nominal.

is unquestionably due to lack of faith in the existing medical facilities in the former. If a patient living in a small community knew that local facilities were adequate for taking care of most of his illnesses, and that, on such rare occasions when his condition demanded special attention, he would more or less automatically be sent to an affiliated institution functioning solely to handle such problems, he would be less tempted to leave his community for medical help, except when it was really necessary, and then only at the suggestion of his family doctor.

There is an unfortunate tendency for patients, especially in large communities, to lose sight of the great importance to themselves of having a physician who can serve in the traditional capacity of a true family doctor. In general, the benefits to the patient which result from a patient-and-family-doctor relation are the greatest of all medical benefits. It is only through this association that the conditioning effects of background and environment can be fully evaluated. The family doctor knows his patient as no other doctor knows him. It is he who should decide when a specialist is to be consulted, or whether it is necessary or desirable for the patient to leave home for medical care.

When in the not too dispassionate discussions of medical economics, today, reference is made to the great importance of maintaining the patient-doctor relation, what we really have in mind is that between the patient and the family doctor. That of a patient to a specialist or a full-time clinic or hospital physician can, at best, never be very personal or fully satisfying, in the sense that the relation of such a patient to a family doctor can be. Every patient should have a medical base, through which all his medical benefits derive, and that base should be the family doctor. A patient with no attachment to such a base is needlessly, and often dangerously, stranded. This important fact has been given prime consideration in the development of our program, a program which, recognizing that the fundamental basis of all medical practice is the patient-and-family-doctor relation, is designed to strengthen it and make it more effective.

In the foregoing there have been presented certain general principles, as well as the initial details

of development in their direction. It is to be emphasized that the entire program of development has purposely been left very flexible. The scope of the work is being gradually broadened and extended only as it appears to meet the needs and desires of those concerned. Individuals and local situations are given the greatest possible consideration. Practicable suggestions are constantly welcomed and developed. Everyone concerned, being under no obligation whatsoever, is free at any time to accept or reject whatever he pleases. New steps are taken only when there is assured and mutual co-operation. On such principles rests the development of the program. To such purposes is the new Joseph H Pratt Diagnostic Hospital dedicated.

#### SUMMARY

The Joseph H Pratt Diagnostic Hospital is intended to further the medical program of the Bingham Associates Fund. An attempt is made to describe in a general manner the present status of the work of the Bingham Associates Fund, through the New England Medical Center, in the extension of medical benefits to small communities, and to indicate the direction of further progress.

At present the work is divided into three main divisions: diagnostic aid, hospital extension services and postgraduate education.

The plan is broadly designed to extend into small communities the medical advantages of a metropolitan center by direct and indirect contacts between these elements, arranged on a permanent working basis. The indirect contacts are through strategically located regional centers. It is intended that the communities concerned maintain full opportunities for independent work but that this work be integrated with that of the metropolitan and regional centers. In this manner it is hoped that there will be established regular and directed channels for the quick and effective passage of medical developments from large medical centers to small communities.

30 Bennet St.

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mal or didactic presentation. Informal teaching is possible only with small groups, hence our courses are limited to six physicians. Because of the natural variability of special interests, we have allowed for some degree of flexibility in subject matter. We believe it will be possible to bring about a more or less automatic state of continual education for most, if not all, of the physicians attached as staff members to the affiliated hospitals.

A postgraduate program, such as is being developed at the Joseph H. Pratt Diagnostic Hospital through Tufts College Medical School, seems particularly purposeful, being, as it is, continuous and progressive, and emanating from a source with which a permanent attachment is established locally through community hospitals, and centrally through a clinical medium for the management of difficult problems. The whole exists primarily for the benefit of the general practitioner, who may, if he wishes, use it as his own for the purpose of making available to himself, in a continuous manner, more opportunities to practice better medicine.

The final approach to the general practitioner is through his community hospital, which serves as the local base for this broad educational program. Without such a base, the educational approach from a school to the physician is beset with all sorts of difficulties, particularly as regards the establishment of a self-perpetuating and permanently functioning program.

#### GENERAL DISCUSSION

The scientific and technical advances of modern medicine, because they demand specialization and elaborate equipment, are by and large effectively applicable only through hospital or clinic facilities. Herein lies the basis for the development of so-called group practice, which is essentially clinic practice. It is our opinion that, at least so far as the general practitioner in a small community is concerned, the soundest basis for handling the needs which have given rise to the demand for group practice is a community hospital. With the opportunity to utilize, when necessary, a well-equipped and adequately functioning community hospital, the informed general practitioner can give entirely satisfactory medical care to most of his patients. If, in addition, he has facilities for easy access to help when, again, through being well informed he recognizes the need for such help, he can truly be said to be able to offer to his patients the most complete and the best available medical care. Hence the necessity for an educational program, so that the physician will be well informed, the hospital extension service, so that his hospital will function adequately, and

graded medical centers, for the handling of special problems.

There remains the problem of supplying adequately equipped hospitals. This we are financially unable to do, but we are encouraged by the fact that poorly equipped hospitals are often willing to improve their physical equipment if they are given the opportunity to make good use of these improvements. Thus, when the electrocardiographic service was offered, several of the affiliated hospitals bought electrocardiographs, and when the laboratory service was offered, several arranged to set up extremely well-equipped laboratories, whereas previously they had had practically no equipment.

Incidentally, as the hospitals of various sizes themselves are enabled to do more and better work, their income can be expected to increase. When the Rumford Community Hospital can have an electrocardiogram made, or a special x-ray procedure carried out, on a patient who previously would have had to be sent some distance for such work, this hospital can expect to receive for this work the money which, also, would have gone elsewhere. For this reason, at least some of the program of hospital extension activities can be expected to be self-supporting. At present, the complete program is being almost entirely subsidized by the Bingham Associates Fund.

The hospital extension services are a natural development of the postgraduate teaching program. These services were begun after it became evident that in order to make postgraduate instruction more worth while, the physicians must utilize, in their own community hospitals, diagnostic and therapeutic aids which had been demonstrated as being valuable. Postgraduate instruction is incomplete if physicians are taught how to apply intelligently and utilize such aids, and then left with no means for securing them. In following treatment with sulfanilamide there would be no advantage in giving instruction as to the value of estimating the level of this drug in the blood unless facilities were made available in the postgraduate student's local community for such determinations. Our purpose is to make it possible for physicians practicing in small communities to be able to make more valuable their period of postgraduate study at the New England Medical Center by making locally available to them facilities which were of demonstrated practical value. Their own community hospitals can thus serve to continue the benefits of their instruction.

It is natural to want to be near one's home and family when one is sick. The fact that there has developed a tendency for patients to go from small communities to large centers for medical attention

were granted parole privileges. Improvements in this group were generally monosymptomatic or affected only very few symptoms, for example, activity disturbances such as excitement or stupor might disappear, hallucinatory experiences might become less vivid and as a consequence less harassing to the patient, delusions might show some change, although this was not frequently observed in patients in this group. Generally the ameliorated institutional adjustment was such that the patient became capable of doing some productive work, which had formerly not been the case.

D *No change*

E *Aggravation of symptoms* In this group, activity disturbances supervened and were so severe that institutional adjustment became quite poor. All these patients manifested excitements which necessitated sedation and other measures of restraint.

In Table 1 there is presented the outcome for all cases six months after treatment, and also the outcome by sex. It may be seen from this table

TABLE 1 Outcome after Six Months for All Cases and According to Sex

OUTCOME	WOMEN		MEN		ALL CASES	
	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT
A	17	10	4	10	21	14
B			9	24	9	6
C	24	22	8	21	32	22
D	37	34	10	26	47	32
E	4	4			4	3
Re treated	24	22	6	16	30	21
Dead	2	2	1	3	3	2
Totals	108		38		146	

that 21 patients (14 per cent) manifested complete remissions, and 9 (6 per cent) were much improved. The remaining 116 patients (80 per cent) showed some improvement, no change or became worse. Thirty patients (21 per cent) had been

patients (108), but there is some indication that the former may do somewhat better. No statistical validity, however, is attached to this observation.

A remission rate of 14 per cent under treatment in schizophrenia does not seem at first glance to be of any significance. The spontaneous remission rate is approximately this figure, and by some investigators has been shown to be even slightly higher. However, when one considers the large number of chronic patients in this series, the efficacy of Metrazol treatment in the determination of the remission and improvement rate seems to be greater than might have been expected if the patients were untreated. (This point is made clear in a consideration of Tables 4 and 5.)

In Table 2 the therapeutic outcome after six months as related to the type of schizophrenia is presented. It is shown that in the group there were 31 paranoids, 50 hebephrenics, 40 catatonics, 20 patients of "other types," and 5 classified as "simple." Of the catatonic group 20 per cent manifested complete remission and of the paranoid 13 per cent. The hebephrenics had a 10 per cent remission rate and "other types" 15 per cent. From a statistical standpoint it must be stated that no differentiation of the results of therapy in these types can be observed. In this series the catatonic patients have an average duration of illness which is shorter than that of the paranoids. Since it will be shown here that the shorter the illness the better the outcome, the differences between the catatonics and the others cannot be considered significant purely on the basis of type. Furthermore, the number of cases in each group is not large enough to permit ascribing differences in outcome to type to the exclusion of other factors, for example the duration of illness.

In Table 3 the outcome as related to the patient's age is presented. It seems clear from this table that the outcome is better if the patient is

TABLE 2 Outcome According to Diagnostic Type

OUTCOME	PARANOID		HEBEPHRENIC		CATATONIC		OTHER TYPES		SIMPLE
	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	
A	4	13	5	10	8	20	3	15	1
B	1	3	3	6	3	8	1	5	1
C	10	33	1	2	5	12	3	15	2
D	9	29	13	26	13	32	6	30	1
E	1	3	1	2	2	5			
Re treated	5	16	10	20	8	20	7	35	
Dead	1	3	1	2	1	3			
Totals	31		50		40		20		5

given one or more additional courses of treatment during this six-month period, and 3 had died.

The therapeutic outcome by sex was as follows. The small number of men patients (38) cannot be adequately compared with the number of women

under thirty (remission rate 21 per cent) than if he is older, but that a fair number of remissions (14 per cent) are possible in the age range of thirty to forty. In the age range of forty to fifty the outcome must be considered much more pes-

# FACTORS INVOLVED IN THE STABILITY OF THE THERAPEUTIC EFFECT IN THE METRAZOL TREATMENT OF SCHIZOPHRENIA\*

## Report of 146 Cases

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FROM the data already available in the literature the significance of various factors involved in the determination of the efficacy of Metrazol treatment in schizophrenia has been pointed out. In general it has been found that the shorter the illness and the younger the patient the more likely he is to benefit by treatment.<sup>4-6</sup> There is some evidence also that the type of schizophrenia may be significant in this respect. The catatonic and the paranoid-hallucinatory types are more favorably affected than is the hebephrenic.<sup>6</sup> It is the purpose of this report to present further data concerning these variables and to indicate the significance of some factors in the prognosis after treatment has ceased.

The following data are based on observations made on 146 schizophrenic patients. Of these, 38 were men and 108 were women. None of the patients showed evidence of any physical disease. Each patient was treated with Metrazol in the same fashion. The initial dose was 3 cc of 10 per cent Metrazol (Bilhuber-Knoll). All injections were intravenous. Treatment was administered daily, the dose being increased by 1 cc until a convulsive threshold was reached and thereafter maintained at that level. Preliminary hydration and alkalization were not carried out, these having now been shown to be unnecessary.<sup>1, 3</sup> Treatment was discontinued when further improvement seemed improbable. This is admittedly an arbitrary criterion which rests entirely upon clinical judgment, however, there are no data available as yet which prove what the optimal number of seizures may be for schizophrenics as a group nor what factors must be considered in the determination of individual variations in this respect. In some of the patients repeated courses of treatment were necessary, as will be shown in the tables.

The clinical status for each patient was rated at specific time intervals after the cessation of treatment. Judgments were made at the end of treatment, and two weeks, one month, two months, four months and six months later. For many of the patients data are available for periods over a year, but in order to have a sufficient number of cases upon which to base conclusions the present

report is not concerned with outcome beyond the six-month period following treatment. Only the outcome after six months will be presented, since data with regard to shorter periods are already extensively available and do not appear to contribute very much to the elucidation of the problem.

## RESULTS

Data are presented covering the therapeutic outcome for all cases six months after treatment, the significance of sex differences, of differences due to the diagnostic types of the disease, of differences due to the patient's age, of differences due to the duration of hospitalization and of differences due to the duration of illness, and finally a comparison of the outcome after six months with that after one month.

Therapeutic outcome was judged and classified under five headings as follows:

**A Complete remission** Remission was considered to consist of complete freedom from all symptoms, the ability of the patient to leave the hospital and resume his former occupation and the absence of any observable peculiarities. In other words, the patient's condition was considered to be that of a full remission only if he again became the same person, so far as could be recognized, as he had been before his illness.

**B Marked improvement** In this group, symptoms had disappeared almost entirely, residual symptoms being such that they did not interfere with an adequate social adjustment. For example, a patient who manifested some shallowness of affect or relatively inconspicuous mannerisms would be considered to have shown much improvement if his condition were such that he could go home, or enjoy full parole privileges. The continued presence of hallucinations, delusions or severe activity disturbances would exclude any patient from this group, however much improvement might occur in his social adjustment in the hospital.

**C Some improvement** In this group were patients in whom such modification of symptomatology occurred that a better institutional adjustment became possible. In no case were these patients well enough to go home, although some

\*From the Research Service of the Worcester State Hospital. Presented at a meeting of the Boston Society of Psychiatry and Neurology, February 16, 1939.

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tained this status without change but the rest (69 per cent) had relapsed. Of the 31 patients who had shown no change, 1 achieved a complete remission and 2 showed slight improvement, but 90 per cent had not changed their status. It is of interest that of the 3 patients who were worse one month after treatment 2 improved without re-treatment. On the basis of this sample it would appear, therefore, that the patient's outcome six months after cessation of treatment may be predicted from his outcome one month after treatment, if he has achieved full remission, his chances

gloomy. The fact seems clear that if the patient becomes completely well after treatment his chances of remaining well are excellent, and it is only by the criterion of full remission that the potency of Metrazol, with respect to the stability of improvement, can be measured.

#### SUMMARY AND CONCLUSION

Data have been presented on the therapeutic outcome after six months in 146 schizophrenic patients in whom daily treatment with Metrazol had been carried out. It was shown, as others have

TABLE 6 Outcome One Month after Treatment as Compared with That Six Months after Treatment

SIX MONTH RATING	A		B		ONE MONTH RATING		D		E	
	No of Cases	Per Cent	No of Cases	Per Cent	No of Cases	Per Cent	No of Cases	Per Cent	No of Cases	Per Cent
A	16	89	4	10			1	3		
B			8	20					1	
C	1	5.5	11	27.5	17	31	2	7	1	
D	1	5.5	6	15	16	30	24	77		
E			1	2.5	1	2	1	3	1	
Re treated			10	25	18	33	2	7		
Dead					2	4	1	3		
Totals	18		40		54		31		3	

of remaining well are great (in our sample, 89 per cent), but if he has fallen short of full remission the chances of maintaining his improvement are relatively small (in our sample, 30 per cent). The conclusions may therefore be drawn that in the evaluation of Metrazol therapy one must consider that only those patients who become *completely* well will so continue, and that patients who do not become completely well have only a third as good a chance of retaining even the considerable improvement which they may have manifested immediately after cessation of treatment.\*

The data of Table 6 may lend support to some general considerations concerning the nature of the schizophrenic process. It appears from these data that in most cases recovery can be maintained only if the schizophrenic symptoms can be removed in toto. Conversely, if there remain any residual symptoms the probability of relapse is high. These statements may indicate that the schizophrenic disease process is an "infiltrating" one, analogous, perhaps, to neoplastic processes. One might push the analogy further and suggest that in the early stages the process may be relatively benign and with treatment can be effectively removed from the personality, but that when malignancy of the nature of personality infiltration has occurred, the outcome is

pointed out, that therapeutic results are better in young patients with a short hospital age and a brief duration of illness. Differences due to diagnostic type or to sex could not be demonstrated. It was found that the stability of the therapeutic effect, as compared one month and six months after cessation of treatment, depended largely on whether full remission had occurred. For those patients who achieved full remission, 89 per cent remained in this fortunate state after six months. On the other hand, of those patients who had shown much or slight improvement after one month, only 30 per cent retained the improvement after six months. The conclusion may therefore be drawn that anything short of a full remission must be considered pessimistically, so far as this therapy is concerned, with respect to ultimate clinical status, although amelioration of the patient's institutional adjustment may, in about one third of the cases, be expected to persist.

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\*From an administrative standpoint the fact that about a third of the patients retained an ameliorated hospital adjustment after six months should however be emphasized.

simistically (remission rate 6 per cent) Since the patient's age is intimately associated with hospital age and duration of illness, the therapeutic out-

TABLE 3 Outcome According to Age

OUTCOME	UNDER 30 YEARS		30-40 YEARS		40-50 YEARS		50 YEARS AND OVER	
	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT
A	12	21	7	14	2	6		
B	7	12.5	1	2	1	3		
C	7	12.5	10	20	12	39	3	30
D	17	30	13	27	12	39	5	50
E	1	2	2	4	1	3		
Re treated	10	18	15	31	3	10	2	20
Dead	2	4	1	2				
Totals	56		49		31		10	

greater support is lent to this suggestion In this table it may be seen that only 22 patients (15 per cent in all) had been ill less than one year, the remission rate for this group is 59 per cent Although data on spontaneous remission rates are not available for patients who have been ill less than one year, I am of the opinion that a figure of 59 per cent is well above that which might be expected for this group

The above tables show generally what has previously been observed by other investigators, namely that the shorter the duration of illness, and, concomitantly, the younger the patient and the shorter his hospital age, the better, is the therapeutic outcome with Metrazol treatment

The question arises as to what prognostic opinion may be attached to given patients after the cessation of treatment It is a common practice, for example, for investigators in this field to state frankly to the patient's relatives that although the immediate change might be beneficial, how long it will last is another question The following data throw some light upon this question In Table 6 there are presented data which compare the patient's status six months after the cessation of treatment with that one month after the cessation of treatment The status one month after the cessation of treatment rather than immediately afterward has been taken in order to eliminate cases with short-lived changes, and also to include patients whose condition may improve within the first month after cessation of treatment

Several facts stand out in this table The most striking seems to be that of the 18 patients who underwent complete remission, 16 (89 per cent) enjoyed this status six months later Of the 40 patients who had shown much improvement, 4 attained complete remission and 8 maintained their improvement, largely due to the fact that most of these patients had had subsequent courses

come as related to these variables must be considered These data are presented in Tables 4 and 5, which should be studied together with Table 3 in the evaluation of Table 1 shown above

TABLE 4 Outcome According to Duration of Hospitalization

OUTCOME	UNDER 1 YEAR		1-3 YEARS		3-5 YEARS		5 YEARS AND OVER	
	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT
A	19	37	2	7				
B	3	6	2	7	1	4	3	7
C	8	16	11	39	5	21	8	19
D	9	17	9	32	10	42	19	44
E	1	2	1	4			2	5
Re treated	10	20	3	11	7	29	10	23
Dead	1	2			1	4	1	2
Totals	51		28		24		43	

As was indicated in the discussion of Table 1, a remission rate of 14 per cent for all cases after six months was found In Table 4 one may observe that the remission rate is 37 per cent in patients who had been hospitalized less than one year, 7 per cent in patients hospitalized one or two years, and none in patients who had been hospitalized for longer periods On the other hand, of the entire group only 51 patients (35 per cent) had

TABLE 5 Outcome According to Time from Estimated Onset

OUTCOME	UNDER 1 YEAR		1-3 YEARS		3-5 YEARS		5-10 YEARS		10 YEARS AND OVER		UNKNOWN
	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	NO OF CASES	PER CENT	
A	13	59	1	5	3	14	2	6	1	2	1
B	2	9			1	5	6	18			
C	4	18.5	10	56	6	29	4	12	6	14	2
D	1	4.5	3	17	8	38	11	33	21	48	3
E	1	4.5	1	5					2	4	
Re treated	1	4.5	3	17	3	14	8	25	14	32	1
Dead							2	6			1
Totals	22		18		21		33		44		8

been hospitalized less than one year The lowness of the remission rate for all cases may therefore be ascribed in part to the prevalence of cases with a high hospital age Furthermore, when these data are considered together with those of Table 5,

of treatment These 12 patients comprise only 30 per cent of the B group, hence of the 40 patients who had shown much improvement, 70 per cent had relapsed Of the 54 patients who had shown some improvement, 17 (31 per cent) had main



matters die in committee Under this procedure, a bill never sees the light of day unless a committee selects it as one on which they wish to make a report The same procedure is followed in Congress But in Massachusetts, when prorogation takes place, every measure must have been reported upon

There are a number of technical reports a committee can make, but in the main they fall into one of two classes—favorable or unfavorable

If a petition, accompanied by a bill or resolve is reported adversely by a committee, it is placed on the calendar in the branch in which it was reported and any member has the privilege of moving substitution of the bill or resolve and of getting a roll-call vote on it, providing he can get thirty members to join in the request If the petition is rejected in one branch, it must go to the other branch for concurrence in that rejection

If a bill or resolve is reported favorably by a committee on a petition referred to it, the measure is first read in the branch to which it is reported, and this is called the First Reading of the bill or resolve Unless this matter is one that requires reference to some other committee,—such as the Committee on Ways and Means or the Committee on Counties, because it provides for the expenditure of state money or is a county matter,—it is placed in the orders of the day for the next legislative day, without debate, for a second reading At this stage it is debatable, and can be amended or rejected If rejected, being a bill, it is dead, and does not go to the other branch If ordered to a third reading, it is referred to the Committee on Bills in the Third Reading of that branch This committee is a highly technical one and has a staff of legal experts attached to it Its sole function is to see that the bill has been “correctly drawn,” that is, that its provisions are not unconstitutional and that its legal phraseology is correct, and to redraft it, if necessary, in such a way that it will fit into the form of the General Laws The only report that this committee can make is that the bill has been correctly drawn, or to suggest an amendment in order to clarify the wording, and if it sees fit it can recommend that it ought not to pass In other words, it cannot make substantive changes

When the report of the Committee on Bills in the Third Reading appears on the calendar, the question before the branch considering it is, Shall the bill be passed to be engrossed? At this stage it can again be amended or rejected entirely, and if it is, it does not go to the other branch If the measure is passed to be engrossed, it is held one day so that any member may exercise his right to ask for reconsideration, and it is then sent to the second

branch, where, after its first reading, it takes the same course that it took in the first branch

If the second branch amends the bill in any particular, it is returned to the first branch for concurrence in the amendments If it substitutes a new bill, that bill is sent to the first branch and it goes through the same process as if it never had been considered by it, namely three readings If the two branches do not agree in the amendments made, and neither will recede from its decision, a committee of conference is appointed as in other cases of disagreement, and its recommendations are usually accepted If the branches still cannot agree another committee on conference may be appointed, but usually not more than three such committees are appointed, and the measure, for want of agreement, dies between the branches

After a bill has been passed to be engrossed in both branches, it is sent to the Secretary of State's office and is engrossed on parchment paper with a special typewriter This copy must be accurate, as it is the authentic document, which is reported to be “rightly and truly engrossed” by the Committee on Engrossed Bills

The bill is then enacted, first in the House, and then in the Senate after which it is sent to the Governor Under the Constitution, the Governor is allowed five days to act on the measure If he signs a bill involving general legislation, it becomes law in ninety days, under the provisions of the constitutional amendment regarding the initiative and referendum unless it has an emergency preamble, when it takes effect at once If the Governor takes no action within five days, the bill becomes a law automatically, but he may veto a bill by returning it to either branch with his objections, and if two thirds of the members of both branches vote to override his veto the bill becomes law, notwithstanding his objections

The House and Senate journals record every stage of action by both branches on a petition for legislation up to and including the moment it receives the signature of the Governor

This, briefly, is the procedure followed with regard to proposals for legislation to the General Court

From the point of view of the layman, this procedure is important Unless rules are suspended for an emergency, from two to three weeks are required, after a committee has reported on a measure, for it to get to the Governor's desk During this period of time popular sentiment can be aroused either for or against the measure.

There are differences of opinion as to what in-

## LEGISLATIVE PROCEDURE\*

CHRISTIAN A. HERTER†

BOSTON

THE Massachusetts legislature and that of Iceland are the only two truly democratic legislatures left in the world. The Massachusetts Legislature used to be called the "Great and General Court for the Redress of the Grievances of the Common People." It is now called the "General Court," and while it has never been known as such in the literal sense, it has always been thought of as a court which sits in public to listen to grievances and to remedy them, through the enactment of legislation. Hence the use of the more common name, the Legislature.

Our procedure is very different from that of other states in that it contains the elements of true democracy that none of the others have. For example we have the constitutional right of free petition, which guarantees to every citizen the right to draft and sign a petition, accompany it by a bill, resolve or resolution explaining the legislation sought, no matter how ridiculous, and have it presented to the Legislature by requesting a representative or senator to place his name on the back of the petition blank. The legislator, however, can indicate that he personally does not necessarily sponsor the provisions of the measure, by adding after his name the words "by request."

The number of petitions presented every year, considering this tremendous leeway, is small, but even a small number consumes a great amount of time when one considers the many channels through which, under the rules, a measure must pass and the careful scrutiny it receives before it is enacted into law. This year, we have before the General Court the largest number of measures ever filed—approximately twenty-five hundred, this number includes state departmental reports with recommendations for legislation, and reports of about twenty legislative recess commissions, representing studies made during the recess of last year. Under the rules, all proposals for legislation are required to be filed on or before the second Saturday following the date of convening of the session.

A petition for legislation, after being presented to the legislative clerks, is referred by them to a committee, subject to the approval of the presiding officers of both branches. There are twenty-nine joint standing committees which are appointed by the president of the Senate and the

speaker of the House. The petition is then as signed a date for a public hearing, and a clerk sends a postcard notice to the legislator who introduced the measure and to the petitioner seeking the legislation and to anyone who has requested a notice. A large amount of money has been saved in recent years by discarding the custom of the wholesale advertising in the newspapers of the date of a hearing on a petition. The rules state that when a petitioner can be reached by written notice, no such advertising shall be used. It is important that anyone who has any interest in a pending petition should notify the clerk of the committee to which it has been referred at an early date so that he may be notified of the hearing date.

The *Legislative Bulletin* publishes a list of all matters as they are referred to committees, showing the number and title of the petition and the date of the hearing. This bulletin later carries the action of the committee, an index of all matters referred to committees and a running record of what happened to each measure at every stage of its progress through the House and Senate, action by the Governor and the chapter number assigned if it becomes a law.

The bill, resolve or resolution accompanying the petition or the report is printed. Under the rules, nine hundred copies of each measure are printed for the use of the Legislature, and copies may be obtained by the public at the Legislative Document Room on the fourth floor of the State House.

At the public hearing, the committee usually hears persons in favor of a proposal first, and those in opposition afterward. Some hearings have been known to last over a period of six weeks, as in the case of a proposal to remove a judge, while others last only a few minutes. As a general rule petitioners are allowed ample opportunity to present their case, it being the function of the committee to give a fair, adequate and complete hearing to all who are interested in the measure.

After the hearing on a measure has been completed, the committee goes into executive session to determine what recommendation it will make to the Legislature with reference to the disposition of the petition, or other subject of legislation. The sessions of almost all other legislatures are limited to sixty or ninety days. In such states, they may pigeonhole or table proposals for legislation, or let

\*An address given at the annual meeting of the Massachusetts Central Health Council Boston February 16 1939

†Speaker of the Massachusetts House of Representatives

of the chest. Signs of inactive tuberculous chest lesions were found in 2 cases. One of these patients had also had a tuberculous kidney removed. One patient had a tuberculous prostate, with a urinary fistula located just above the pubic bone. A fifth case, which was treated here for disease of the symphysis pubis, is not included in the series, as it was ultimately diagnosed as non-tuberculous because of the repeatedly negative guinea-pig inoculations and Mantoux tests.

#### TREATMENT

The usual treatment in the past was thorough curettage of the infected bone and drainage of any abscesses present, in accordance with the accepted treatment for osteomyelitis. Thus, many of the earlier reports<sup>1</sup> state that the bone was curetted and the wound cleaned and drained. Unfortunately very few reports include follow-up, and the ultimate result of this procedure is not recorded. Bean treated his case with curettage, and in addition laid a bone graft across the horizontal portions of the pubis. The bone ultimately filled in, but the graft was absorbed. The patient improved and her symptoms disappeared. Jackson<sup>2</sup> in 1923 reported a case of tuberculous symphysis pubis in a girl of eleven who had difficulty in walking and then developed an abscess on the right thigh just below Poupert's ligament. She was treated conservatively and followed by x-ray studies for several years and ultimately showed new bone formation in the diseased area.

The first patient (Case 1) seen at this sanatorium was a Negro of forty-seven admitted in August, 1926. A fusion of the symphysis pubis had been performed at another hospital, a tibial graft being used to bridge the diseased area. Following the operation the wound broke down and drained. X-ray films at this institution showed the graft floating in pus. This sequestrum was removed, and the cavity curetted. Most of the operative wound healed, and the patient was eventually discharged with a small pin-point sinus still draining but with his general condition good.

The next case was that of a white man, aged fifty (Case 2). Having had experience with the previous case, and with the widely accepted clinical fact that bone grafts do not attach themselves favorably in a tuberculous field, we decided that a new method of approach was desirable. It occurred to our orthopedic consultant, Dr. Zabdriel B. Adams, that the pubic bones could be splinted by ankylosing both sacroiliac joints, thus steadying the entire bony pelvic ring.

The pelvic ring is made up of the innominate

bones, united in front by the symphysis pubis and joined in back to the sacrum. By elimination of whatever motion may be left at the sacroiliac joints, the motion in the anterior portion is reduced to a minimum. The main advantage of this procedure is that we work in a clean field, whereas the former procedure of curettage and laying down of a bone graft in a diseased field may result in the breaking down of the wound, with resultant formation of sinuses and sequestration of the graft.

This procedure was tried on this patient and also on 2 others, a girl of fifteen (Case 4) and a boy of sixteen. The type of fusion operation is of secondary importance, as the operation is performed in a clean field and on healthy bone, and any type of fusion if efficiently performed will result in ankylosis of the joint. We used both the Smith-Petersen and the Campbell methods.

In Case 4, the fusing of both sacroiliac joints did not at first prove sufficient, and we therefore resorted to the old procedure of curetting the diseased area and laying down a bone graft. Sequestration resulted, and several bone spicules were removed from a suprapubic sinus which developed after the operation. The sinus eventually stopped draining, and the patient was discharged in good condition. She was last seen two years and ten months after her last operation and was in good general condition, free of all symptoms, and with the sinus closed.

#### CASE REPORTS

*Case 1.* C. H. A., a 47-year-old Negro, in 1916 developed an abscess in the left groin. It was incised and drained for 1 week. In 1918 a similar swelling developed in the right groin. It remained the same size until 1926, when it became considerably larger. The patient was admitted to a hospital in Boston, where the abscess was aspirated. X-ray films of the pelvis taken at that time showed a destructive lesion in the symphysis pubis, and an ankylosis operation was performed, using a bone graft from the left tibia. Nine days later the wound broke down and began to drain. The patient was admitted to the Lakeville State Sanatorium on August 2, 1926, because of this discharging sinus. The discharge was profuse and was found positive for tubercle bacilli.

X-ray films of the chest showed several calcified nodes in both hili, with infiltration of both apices. Films of the pubis showed a sequestrum of the former bone graft, floating in a field of pus. This sequestrum, along with several fragments of broken-down and frayed dead bone, was removed from the channel where the graft lay, and the cavity was curetted. Most of the operative wound healed and was reduced to a pin-point size. The patient was discharged a little over 2 years after admission, with the sinus still showing a slight amount of discharge. The last x-ray films before discharge showed beginning bony ankylosis of the symphysis pubis and increased calcium deposit. He was in good general condition and free from local symptoms.

*Case 2.* R. D., a 50-year-old man had had his right

fluences the legislator in making his decision before voting on legislation. The more I have seen of the legislative process, the more I am convinced that outside agencies studying legislative problems and making analyses are responsible for more legislation than are the legislators themselves. It would be absurd to assume that a legislator could vote on twenty-five hundred matters without seeking advice. In most cases, the committee is swayed by individuals whose judgment it respects. Almost all legislative bodies act as a result of the pressure of various forces. There are always proponents and opponents. The legislator is torn between the two, and when, through lack of facts at his disposal, he is incapable of forming an independent decision, he must rely on the judgment as well as the wishes of the district from which he comes.

You hear much about lobbyists. They are a useful group to a legislator. They are, to be sure, hired by some organization. They register themselves, under the rules, as paid lobbyists, and they give the member more real information on a given subject than he could easily get elsewhere. That is their business. They try to give you facts and

if at all experienced as lobbyists, they know that it is dangerous to supply you with wrong data because it will hurt them. It is the lobby group from which the members get more information than from any other. For example, Dr. Blank is a lobbyist. He is registered as representing a definite organization. He is a good lobbyist because of his accurate information and his good judgment. Unfortunately, the term "lobbyist" is applied to everyone who tries to influence legislation. They are not all equally useful. There are a good many different ways of lobbying—that is, different techniques.

You in this organization have much greater strength than you realize. If you appeal to the intelligence of the community in which the individual legislator lives you can exert a tremendous influence, whether you realize it or not. In any man's district, two groups have great influence—the church and the medical and nursing professions. This is because both groups have contacts with many people and have many opportunities for spreading respected word-of-mouth opinion.

State House.

## TUBERCULOSIS OF THE SYMPHYSIS PUBIS

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**T**UBERCULOSIS of the symphysis pubis has been reported on a few occasions in the English literature but more frequently in the foreign journals. However, it is still considered too infrequent to warrant its description in either orthopedic textbooks or systems of medicine.

Bean,<sup>1</sup> of Salem, Massachusetts, in 1930 described a case encountered in his practice and comprehensively reviewed the literature written on this subject up to that time. Practically all the preceding reports appeared in foreign journals. Since then no other reports on this subject have appeared in the English literature although one quite frequently encounters descriptions of injuries and osteomyelitis of the pubic bone. In this paper I shall report 4 cases of tuberculosis of the symphysis pubis, treated at the Lakeville State Sanatorium, describe the commoner symptoms and findings and discuss in detail the operative procedure followed in 2 of the cases, namely surgical fusion of both sacroiliac joints.

The commonest symptoms encountered, according to most authors,<sup>1</sup> are an irregular gait, a tumor mass and pain in the region of the pubis. Many of the earlier reports emphasize an irregular or painful gait as the chief complaint. The chief symptoms our cases presented were pain over the pubis, a tumor mass and backache. The tumor mass appears oftenest in the groin or over the pubis. It is frequently mistaken for a hernia or psoas abscess. X-ray films of the pelvis, whenever this sign occurs, may show irregularity or destruction of the symphysis pubis or pubic bone. If an abscess is present, bacteriological study reveals the nature of the infection.

None of our patients showed an irregular or painful gait, possibly because they were seen earlier and before the destruction became very extensive. The first complaint that 2 patients presented was swelling in the groin, 1 had pain in both groins and 1 first experienced pain in the region of the left hip.

All the patients had routine x-ray films taken

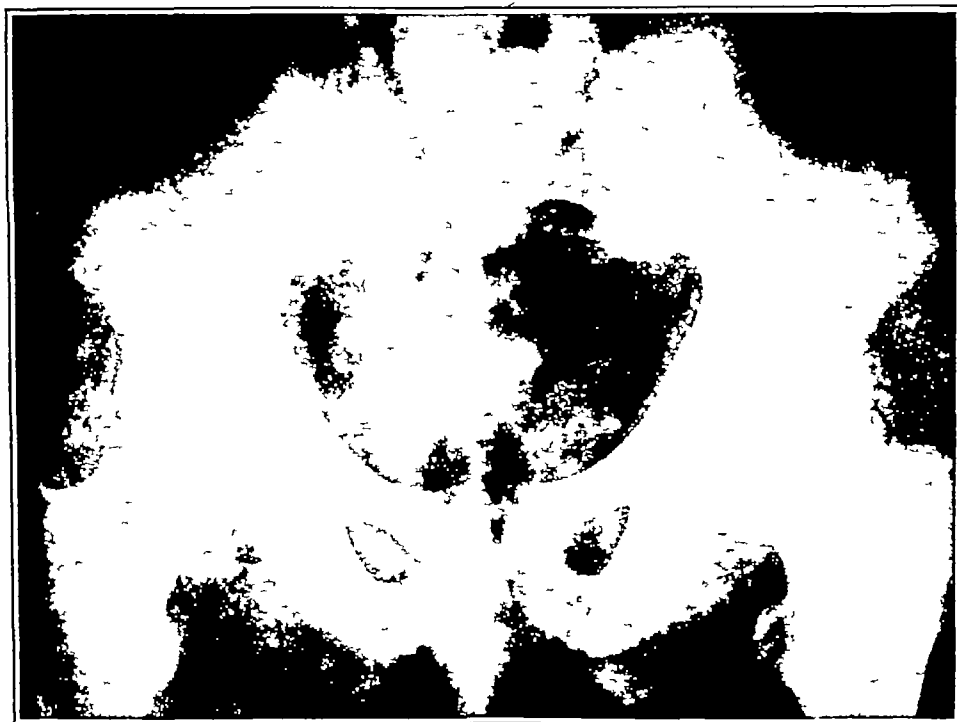


FIGURE 2. Case 2

*This film was taken three and a half years after both sacroiliac joints had been fused surgically. Note the increased calcification and new-bone formation bridging across the symphysis pubis.*



FIGURE 3. Case 3

*The lesion is eight years old. There is a complete loss of cartilage in the symphysis pubis with increased density of the pubic bone and bony fusion of the symphysis.*

kidney removed for tuberculosis in January, 1930. At that time he also showed tuberculous infection of the right lung by x-ray study. He was admitted to the Lakeville State Sanatorium on October 18, 1932, because of pain in both groins of 1 year's duration. Examination on admission showed tenderness on deep palpation in both groins. These areas and the region of the symphysis were free from swelling and induration. An x-ray film of the chest showed bilateral apical lesions, and that of the symphysis pubis showed a process in the left pubic bone, apparently inflammatory. In January, 1933, the left sacroiliac joint was fused surgically and in June, 1933, the right sacroiliac joint was similarly fused. The patient made a good

tract and were apparently due to an old duodenal ulcer. The patient remained only 1 month, and during that time was free of pain or symptoms referable to the symphysis pubis. The cold abscess was apparently absorbed. X-ray films at the time of discharge (Fig 2) showed new bone formation with increased calcification and apparent arrest of the destructive process.

*Case 3* B. S. was a 57-year-old white man. When the patient was 5 years of age, in 1881, a sister, aged 16, died of pulmonary tuberculosis. The patient had been in daily contact with her. In 1925 he developed lameness accompanied by swelling in the left groin. This mass broke



FIGURE 1 Case 2

*Note the destruction of left pubic bone, extending into the upper and lower rami*

postoperative recovery, the symptoms disappeared, and he was discharged.

In December, 1933, he developed pain and swelling over the pubic bone, and in March, 1934, he was readmitted. He showed a lump over the pubic bone the size of a small orange. He was treated conservatively, and the mass gradually became smaller. From time to time an old sinus in the left sacroiliac incision would drain for short intervals. An x-ray of the symphysis showed increased destruction, extending well into the pubic bone on the left side (Fig 1). The suprapubic mass became smaller and at the time of discharge, April, 1935, it was still palpable deep over the pubis and about the size of a hen's egg.

The patient was readmitted in December, 1937, because of an old sinus over the left sacroiliac incision, which continued to drain at intervals. A few drops of this material was injected into a guinea pig and was found to be positive for tubercle bacilli. The mass over the pubis, which had been present on the first admission, was absent. Most of the complaints were referable to the gastrointestinal

tract and drained, and another sinus developed over the pubis. The two seemed connected. The sinus was excised, and the pubic bone was curetted. The suprapubic sinus was later found to be connected with the bladder. The sinuses healed and patient remained well for the next 6 years, except for an occasional drop or two of serous exudate from the suprapubic sinus. In September, 1933, a tuberculous prostatic abscess was found, and the patient was sent to the Lakeville State Sanatorium for further treatment. On admission he showed a scar over the pubis, with a sinus draining purulent material and apparently connected with the bladder. Material from this sinus was found positive for tubercle bacilli on guinea pig inoculation. X-ray films of the chest were negative, but those of the pelvis showed complete loss of cartilage in the symphysis pubis, with increased density of the pubic bones and bony fusion of the symphysis (Fig 3). In addition, the patient had a tuberculous prostate and tuberculous epididymes. The lesion in the symphysis was considered arrested, and he was discharged in November, 1933. A

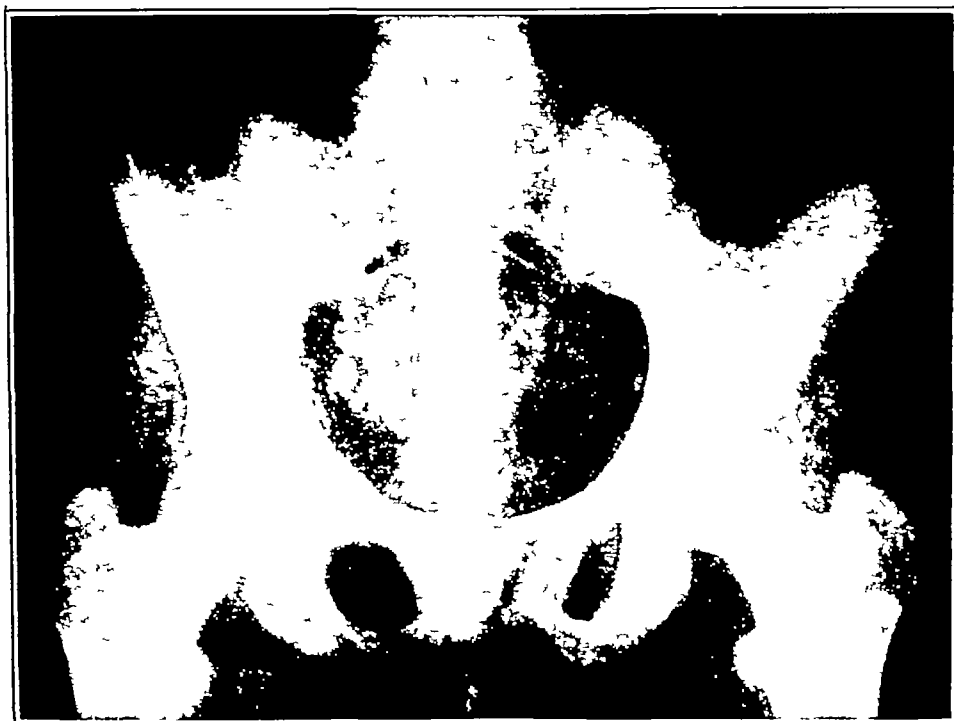


FIGURE 4 Case 4

*Note the destructive process involving the symphysis pubis and the left pubic bone  
Both sacroiliac joints were fused by the Smith Petersen method*



FIGURE 5 Case 4

*This film was taken two and a half years after that shown in Figure 4. A tubal bone graft was laid over the pubic crest two years and three months previously. Note the increased calcification and new bone formation bridging across and connecting both pubic bones*

recent contact with this patient found him in good health and at work, but still having occasional discharge from the suprapubic sinus

*Case 4* H. M. W., a 15 year-old white girl, had a negative family history. In 1931 she began to experience pain in the region of the left hip. In 1932, while skating, she fell and the pain became worse. She was taken to a local hospital, where x-ray films showed a lesion in the symphysis pubis, and she was hospitalized for 5 months. In October, 1934, this pain became more severe and persistent, and she was admitted to the Lakeville State Sanatorium in November, 1934. Physical examination was essentially negative, except for tenderness over the left pubic bone and a groove like depression over the symphysis pubis. X-ray films of the chest were negative. Those of the pelvis showed a destructive process involving the symphysis pubis (Fig 4). Both hips were normal. The patient was treated for 3 months with a short double spica and then had both sacroiliac joints fused by the Smith Petersen method. The operations were performed about a month apart. She was allowed up in June, 1935, 1 month after her second operation. While up and about she complained of pain in the region of the pelvis, localized in the right sacroiliac region and radiating down the right thigh. This pain persisted, and it was decided to fuse the symphysis pubis directly. This operation was performed in October, 1935. A graft was removed from the left tibia and fitted into a groove, which was made to extend across both pubic crests. The appearance and contour of the crest at the time of operation suggested bone degeneration in that area.

Shortly after operation an abscess developed in the suprapubic wound, which broke down and drained. Three sinuses resulted, and two small sequestrums were removed from one of them. After various kinds of local treatment the abscess gradually became smaller and the sinuses healed. The patient was again allowed up, and was discharged in December, 1936, with all the sinuses dry and the abscess healed, she was free from pain (Fig 5). She has been followed in the Outpatient Department every 6 months since then, and was last seen in the early part of 1938. She has remained free from pain and walks normally, and the sinuses have remained dry and well healed. Routine x-ray examinations have shown increased calcification, and new bone formation bridging across and connecting both pubic bones.

#### DISCUSSION

The articulation between the pubic bones is an amphiarthrodial joint, formed between the two oval articular surfaces of the bone. Each of these surfaces is covered by a thin layer of hyaline cartilage. These opposed cartilaginous surfaces are connected by an intermediate lamina of fibrocartilage, which varies in thickness in different subjects. It often contains a cavity in its interior, and it is not lined by synovial membrane.<sup>3</sup> The pubic symphysis can be considered as an accessory joint to the pelvis, the most important mechanical function of the latter being to transmit the weight of the trunk and upper limbs to the lower extremities. The ligaments of the symphysis pubis help in resisting the separation of the iliac bones in all rapid movements. During pregnancy the ligaments are relaxed and therefore capable of more

extensive movement. During normal life there may be strain on the symphysis and its ligaments but very little if any motion. When disease affects this area, conditions are altered, and this side of the pelvic ring becomes subject to stress and strain with every twist and turn of the body. The infection destroys the cartilage and proceeds to increase the space between the pubes by destroying the adjoining bone. Figure 4 (Case 4) shows the ramus of the pubic bone on both sides destroyed by the diseased process. Fixation should be used in the early stages to protect the lesion. For complete immobilization we have used the double short plaster spica. When the patient has reached the convalescent stage a tight pelvic belt suffices.

The ultimate result sought in any tuberculous joint involvement, where the process has gone on to bone destruction, is regeneration of the diseased bone with good bony ankylosis of the articulating surfaces. This decreases to a minimum the future stress and strain on the infected tissue, and helps to prevent the reactivation of the disease. Simple curettage in the non-tuberculous infected processes very often suffices, but in acid-fast lesions this is insufficient and the additional use of a bone graft is desirable. However, experience has shown that bone grafts applied directly in a tuberculous field have very little chance of success and more often than not slough out and form sequestrums. This is true of grafts used for a tuberculous symphysis pubis. Thus, we note that in Case 1 the laying of a bone graft across the symphysis resulted in abscess formation, which cleared up only after the dead bone graft, which was found floating in pus, was removed. In Case 4, likewise, following the graft operation the patient developed a small suprapubic abscess with a few sinuses and several spicules of bone were removed.

The surgical fusion of the sacroiliac joints, on the other hand, provides a new approach to this problem. One objection to this procedure may be that we are fusing joints that normally have very little range of motion to begin with. Much has been written and said about the amount of motion present in the sacroiliac joint. Sashin,<sup>4</sup> as a result of an exhaustive study, reported in 1930 that motion in the sacroiliac joint was at best only slight. Pressure of the superimposed body weight, sudden turns or shifts or any sudden change in position subjected the joint surfaces to great trauma. As a result of this constant pounding, early degenerative changes set in which eventually led to ankylosis. His study was based on findings on 257 postmortem examinations. Brooke,<sup>5</sup> examining 200 anatomical specimens, of which 95 were male and 105 female, found that 37 per cent



## CONSERVATIVE OVARIAN SURGERY IN THE HANDLING OF DERMOID CYSTS

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BOSTON

THIS paper reports the case of a woman of thirty-three in whom dermoid cysts of both ovaries were found, that on the right involved the entire ovary, and that on the left only a portion of it. The right ovary was removed in toto, the left ovary was partially resected and repaired. This conservative point in the technic, as near as I can determine, is not followed as often as it should be. I am therefore reporting this case because it illustrates a procedure, as related to dermoid cysts, not described in textbooks and rarely suggested in the gynecological literature.

Many authors have written papers in which they condemn the indiscriminate removal of ovaries. Few of them have stressed the fact that dermoid cysts can be partially resected and need not always be completely removed. It certainly seems justifiable to spend the time that is required to perform this type of operation when two facts are considered. The first is that dermoid cysts are recognized most frequently during the childbearing years.<sup>1</sup> This consideration alone calls for conservatism. Secondly, the development of an artificial menopause in a young woman presents a difficult problem.

Bonney<sup>2</sup> and Bell<sup>3-5</sup> in their writings also make such a plea. The latter,<sup>3</sup> in order to emphasize this point, says "To me, and to many others, ovarian conservation is a surgical axiom, and I consider the indiscriminate 'clean-sweep' removal of ovaries—as a routine procedure—a surgical sacrilege." However, to my knowledge, this conservative procedure has not been employed in Boston. I have questioned a large number of prominent surgeons and gynecologists many of whom hold teaching positions of professional rank in local medical schools, and only one had ever performed the procedure here described. This individual stated that his case was a very recent one.

For many years it has apparently been the custom in cases of dermoid cysts for surgeons to remove both ovaries completely when bilaterally involved. In many cases this was not done if the patient was in the childbearing stage of life. In such cases the smaller ovary was permitted to remain intact—a procedure dangerous in itself. If, however, the surgeon feared the consequences of leaving such an ovary, whether or not the patient was in the childbearing stage, both ovaries were removed. This produced an artificial meno-

pause with its varying signs and symptoms, often converted a relatively well patient into who suffered more from the symptoms of menopause than she had ever suffered from the dermoid cyst. It therefore seemed to me advisable to serve whatever normal ovarian tissue might encountered in a case of this sort. This opinion concurred in by a pathologist with whom the technic was discussed some time after the operation. He thought that if normal tissue could be demonstrated there would be no reason for removing

I realize that only scanty conclusions can be drawn from one case, but in spite of this I believe am justified in making this report and the accompanying suggestions, since few references to conservation of ovarian tissues in these cases are found in the literature. In addition, the case question is reported because in the seven months which have passed since the operation the patient has had regular menstrual periods and has had no symptoms referable to the menopause. This least indicates the normal functioning of the portion of ovary that was left in and reconstructed at the time of operation, and therefore seems to justify conservative surgery.

### CASE REPORT

L. A. W., a 33-year-old, unmarried woman, had always been in good health except for some of the contagious illnesses of childhood. She presented herself for a routine physical examination because friends had suggested. Her menstrual periods had begun when she was 12 years old, and occurred regularly every 28 days, lasting 3 to 4 days. On occasion her periods were accompanied by slight pain. The amount of flow was moderate, requiring the use of not more than four or five napkins a day. Her last period had occurred on June 22, 1938.

The physical examination was essentially negative. Vaginal examination could not be performed because of a virgin al introitus. Rectal examination, however, disclosed the uterus to be normal in size and position. The right ovary seemed slightly enlarged and tender. The left ovary seemed to be about the size of a closed fist, although filling the right vault. It was not movable, was quite tender and felt tense. A diagnosis of bilateral dermoid cysts was made.

The patient was admitted to the Cambridge Hospital and was operated on July 6, 1938. Exploration of the abdominal cavity disclosed the appendix to be in a retrocecal position, bound down by numerous adhesions and enveloped by a large amount of fat. Only the tip was visible. The uterus was normal in size and position. The right ovary was about the size of a fist. Its capsule was extremely thick, and the ovary lay deep in the pelvis, filling the right vault and posterior cul-de-sac. Numerous hard masses were present near the mid-portion of the posterior

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of all male joints were completely immovable and ankylosed. In none of the female specimens was bony ankylosis present. This study also showed that an increase in cases of bony ankylosis corresponded directly to an increase in age.

The fact remains that clinically we are unable to determine whether the sacroiliac joint is ankylosed. That an infected process did develop in the anterior part of the pelvic ring suggests that the ring in these cases could benefit by additional strength, which is provided by fusing the posterior joints. Our results with this procedure have been most gratifying.

The operation was performed on 3 patients and in two stages, one sacroiliac joint being fused at each stage. The operation takes half or three quarters of an hour and is not shocking to the patient. The first patient who underwent this procedure (Case 2) stood it very well. A large suprapubic abscess, which was present before operation, disappeared, and the patient continued symptom free, even though the symphysis pubis was not completely healed according to x-ray films. Curetting the symphysis pubis and laying a graft of bone across would have meant operating in a tuberculous field, which might have resulted in sinus formation.

We used this procedure also on a boy of eighteen who had draining sinuses from a suppurative process in the symphysis pubis, which later proved to be non-tuberculous in origin. After he was discharged he went to work on a bread truck, making house-to-house deliveries. He was seen several years later, still active and working hard. The sinuses had remained dry, and he was symptom-free.

The third patient (Case 4) received, in addition to the fusion of the sacroiliac joints, curettage of the diseased area and the laying of a bone graft across the pubis. It is doubtful whether the graft held, as she developed a draining sinus and spicules of bone were removed. Nevertheless, she eventually became symptom free and has remained so for three years.

It would be premature to recommend this treatment for every tuberculous symphysis pubis, but our results indicate that it should be considered, and should be used in selected cases. It seems to offer better protection against the return of the disease and its symptoms than do other procedures, and allows the patient to carry on a very active life after the disease has become arrested.

#### SUMMARY

Four cases of tuberculous symphysis pubis are reported.

The commoner signs and symptoms of this disease are described.

A new method of surgical treatment, namely the fusion of both sacroiliac joints, is described, and its results and advantages discussed.

Subsequent to submitting this paper for publication, two more cases of tuberculosis of the symphysis pubis have been admitted to this institution, which suggests that the disease is not so rare as its absence in the literature would indicate.

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of erythema multiforme. These results seem incredible, and will require confirmation. However, both diseases may be so troublesome that it is well worth while to know of this treatment, even if it should be effective in only a small percentage of cases.

These advances in the handling of several recalcitrant skin diseases may be viewed with enthusiasm, but sulfanilamide must be used with great caution. There is a steadily mounting literature concerning its unpleasant and dangerous side effects. Among the various complications are the following: agranulocytosis (sometimes fatal), acute hemolytic anemia, jaundice, fever, purpura, scarlatiniform and morbilliform eruptions, erythema, urticarial tendencies and exfoliative dermatitis. The development of such complications calls for immediate withdrawal of the drug.

Of special interest is the action of sulfanilamide in producing sensitization of the skin to the action of natural sunshine or ultraviolet light. During the administration of the drug and for ten days or more following its discontinuation, a dermatitis may develop in areas exposed to either form of ultraviolet light. The implications of this fact are obvious. No person under sulfanilamide therapy should be so exposed.

#### PSORIASIS

The mystery of psoriasis remains unsolved, but recent investigations have produced evidence which challenges verification and two outstanding new lines of therapy have been described.

As one reviews the old and the new literature on the treatment of psoriasis, impressive descriptions of dozens of fantastically successful "cures" may be found. There, one may find the case histories of hundreds of psoriatic patients who, though suffering from severe and widespread involvement for many years, have cleared up under one or another new form of therapy. The typical patient resists all forms of treatment until finally he submits to the "Asiatic pill," whole pancreas, injection of psoriatic scales, cortical hormone, liver, gold, deep x-ray therapy to the spine, colloidal sulfur, colloidal manganese or some one of many apparently unrelated types of therapy.

It is important to recall that these brilliant results are reported by authors of unquestioned integrity and ability. Their authenticity cannot be questioned. The case histories are convincing because so many of the patients have resisted all therapeutic approaches and have remained unimproved for years, but have cleared up dramatically in response to one of many diverse treatments. Perhaps psoriasis is a disease of multiple etiology and is amenable only to multiple types of

treatment. It does seem true that one often finds the answer to stubborn cases of psoriasis only in a persistent search, by a trial-and-error method, among the many available methods of treatment.

At the present time, in facing the problem of treating this disease, the practitioner should be well acquainted with the technic of administering several of the best accepted forms of treatment. He should bear in mind the efficacy of 3 to 6 per cent crude coal tar, 0.1 to 0.25 per cent anthralin to 6 per cent chrysarobin and 5 to 20 per cent moniodinated mercury ointments. These agents are among the best. Ultraviolet light is good therapy and may be given in the office, or the patient may purchase a lamp and receive more frequent administered exposures at home, after adequate instructions.

X-ray is useful to a limited extent, but should scarcely ever be employed to the exclusion of other methods. For the treatment of the patient having only a solitary patch of psoriasis, x-ray seems to be particularly effective and lasting in its action. In the average case with more widespread involvement, psoriasis clears up almost uniformly with x-ray, but recurrence is the rule, and it should therefore be used only in carefully selected cases and with great conservatism. Psoriasis is a chronic recurrent disease, and the use of x-ray always introduces the hazard that the patient may receive an excessive and unsafe total dosage. Remembering the beneficial effects of the first course of x-ray, he is apt to seek further treatment, and go to a succession of doctors until he gets it. It seems likely that colloidal manganese will stand the test of time and rate a substantial place in the general therapeutic armamentarium, at least until a true specific is found.

In the very long list of therapeutic methods, two outstanding new agents have been mentioned: sarsaparilla and vitamin D. In my experience, both of these methods are well worth trying, but sarsaparilla has seemed to give results far less uniform than those represented in published reports. Vitamin D is known to be effective in only 50 per cent of cases. In 6 successive cases I studied the effects of sarsaparilla consumed faithfully in large doses for several months. Convincing results were not obtained, but in a seventh case a therapeutic miracle was witnessed, and surprisingly good results have been seen in several patients treated by sarsaparilla combined with other remedies. The sarsaparilla treatment of psoriasis goes out of studies concerning fat metabolism of the disease. The total blood fat, cholesterol and blood phosphatids are all about 40 per cent elevated in psoriasis, according to studies by Bürger and U

Very favorable results in the treatment of (

were larger than about half the size of a pea. The left ovary was freely movable and about twice the normal size. About two thirds of it was made up of a single cyst, the capsule of which was extremely thick. There was present, projecting through the wall of the capsule on the upper surface of the ovary, a hard mass. The remaining portion of this ovary appeared normal. The right tube and ovary were removed, and the capsule over the hard structure on the surface of the left ovary was incised. The mass was removed and was found to be a tooth. Cheese like material oozed through the incision, which was clamped in order to prevent further escape. An incision was made through the normal portion of the ovary just below the level of the capsule, and the cyst was completely removed. The raw surface of the remaining portion of the ovary appeared to be normal, and the surfaces were approximated by means of a continuous figure-of-eight stitch. Reconstruction of this portion of the ovary was accomplished, leaving an organ which was about 3 cm long, 1 cm wide and 1 cm deep. Appendectomy was performed, and the abdomen was closed in layers.

The postoperative course was uneventful, and the patient was discharged on the 14th postoperative day. The pathological examination disclosed the right ovary to be replaced by a cystic cavity, filled with greasy, yellowish material and a moderate amount of hair, and the small cyst of the left ovary to be filled with greasy material and two small cysts filled with clear fluid, accompanied by a small tooth. The final pathological diagnosis of all the tissues removed read as follows: Bilateral dermoid cysts of the ovaries, healed salpingitis, healed appendicitis, no evidence of malignancy.

Follow up examinations were made on July 28, August 26 and November 25, 1938, and January 20, 1939. Rectal examination on each of these dates disclosed the uterus to be normal in size and position, and the left ovary to be

about the same in size as it was after repair at the time of the operation. In addition, great importance is attached to the fact that since the operation the menstrual periods have occurred with regularity (every 28 days), have not been painful and have lasted as long as they did prior to the operation.

### CONCLUSIONS

As previously stated, conclusions should not be drawn from the results of one case. Yet, because this patient has had normal menstrual periods without menopausal symptoms since operation, and because this technic is rarely described in the literature, it becomes apparent that a paper of this type may have value for several reasons. It may encourage the employment of this procedure and also impel others to describe their results in the various medical journals. The hope is held out that a possible guide for surgical conduct may develop by the accumulation of such papers, so that one may give an accurate prognosis, based on results obtained in many cases of this type.

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## REPORT ON MEDICAL PROGRESS

### DERMATOLOGY

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THIS brief consideration of present trends in the field of dermatology is in no sense intended to be comprehensive. Instead, several important subjects have been selected and these have been dealt with from a practical viewpoint.

#### SULFANILAMIDE

The steadily increasing use of sulfanilamide in the treatment of diseases of the skin is to be expected from the widespread use of the drug in other conditions. In England and in this country, cases of actinomycosis have been reported to recover following the use of sulfanilamide, after standard forms of treatment had failed.<sup>1</sup> It seems unlikely that all cases of actinomycosis will respond to

sulfanilamide as well. Nevertheless, in dealing with so virulent a disease, any suggestion regarding treatment is always welcome and further trial of the drug seems justifiable. Erysipelas, lymphogranuloma inguinale and chancroid seem to respond well to this useful chemical.<sup>2-4</sup> Cases of pemphigus have also been reported to respond favorably.<sup>5</sup>

In a recent address before the New England Dermatological Society, Abramowitz<sup>6</sup> reported remarkable results in the treatment of the highly fatal disseminating type of lupus erythematosus by small doses of sulfanilamide (5 to 20 gr daily by mouth). With similar doses he obtained excellent results in the management of bullous types

To the scalp, the following ointment (Foerster's scalp ointment) may be applied one or more times weekly, with shampoos one or more times weekly

R Salicylic acid	2.00
Sulfur (precipitated)	2.00
Solution of coal tar (N. F.)	8.00
Aquaphor (Duke)	
Lanolin	aa ad 60.00

The following lotion (Markley's scalp lotion) may be applied daily

R Salicylic acid	4.00
Solution of coal tar (N. F.)	4.00
Camphor water (U. S. P.)	30.00
Alcohol (75%)	q s ad 180.00

General medical studies are in order, and search should be made for foci of infection, intestinal disorders and lowering of the basal metabolism. The presence of acne, however, is by no means a necessary indication that there is anything wrong with the general health. It is my experience that many patients with typical acne are vigorous, healthy, athletically inclined young people, who on expert medical examination prove to be quite normal in all respects so far as can be determined. Some of them seem to be not only healthy but exuberantly so. If some glandular abnormality must be presumed to be a factor, one cannot avoid the assumption that in these vigorous young people there may be some glandular overfunction rather than underfunction. It is well recognized that severe acne may be associated with adrenocortical tumors. The mechanism of acneiform eruption in this group of cases has never been explained adequately, but the cause may well be an oversecretion of the cortical hormone or a secondary hypersecretion of the male sex hormone, for prolonged administration of the cortical hormone to male rats produces hypertrophy of the sexual apparatus. Since acne occurs in 60 per cent of adolescent women and 70 per cent of adolescent men (Bloch), it may be argued that whatever the glandular factor may be, it must be a part of normal adolescence.

X-ray therapy remains one of the most effective weapons in the treatment of acne, particularly if employed in conjunction with good general dermatological care. Results from x-ray therapy are, however, far short of 100 per cent, though some claim it will cure 80 per cent of cases. It must

Endocrine preparations (female sex hormones (amniotin, and so forth) at various stages of pregnancy have been tried with disappointing results. Disappointment concerning the therapy of acne has been expressed by Wise and Sulzberger<sup>12</sup> and Templeton and T<sup>13</sup> and others. For a careful review of the literature on this subject, the reader is referred to the reports by these men and to the discussions of these papers. It is estimated that in a percentage of the patients with acne, the results obtained by ortho-

Despite the failure of these studies, one hopes that more light will be thrown on this subject and that a successful therapy will be devised. While awaiting the results of their studies of the urine, the authors have found that in both sexes the excretion of female sex hormones was increased and that the clinical picture was increased. If hypersecretion of androgenic glandular factor in acne, or any other form of glandular abnormality is involved, the present endocrine therapy is aimed in quite the wrong direction. It is devised exclusively on the basis of the supposed glandular underfunction and the balancing of glandular deficiency rather than the problem of dealing with glandular overfunction. This concept of therapy is disappointing results cure.

Recent evidence tends to show that in large doses may be of value in the pustular element of acne, but the oiliness of the skin and comedones are unchanged, but the more severe secondary infection improves.

Highly successful results have been obtained<sup>17</sup> in 76 per cent of cases by viosterol in daily doses.

Daily doses of vitamin A, 20,000 and 100,000 U.S.P. units, by Hinrichsen and Ivy,<sup>11</sup> results in one to five months in that the action of vitamin A on acne was to increase the thickness of the stratum corneum.

of psoriasis were obtained by a low-fat diet, but this form of treatment had to be continued over a period of many months and to most patients proved very burdensome. Therefore, search was made for some therapeutic agent which might be useful in lowering the blood fat without its being necessary to resort to a low-fat diet. An old remedy was resuscitated, namely the sarsaparilla root, which contains saponin as its chief active principle, and since saponin possesses the power of combining with cholesterol, it seemed a logical remedy.

The sarsaparilla treatment consists of the administration of ten to forty-five tablets (Sarsaparilla-Tabletten Bürger)\* daily for from three to five months or more. Slight to marked restriction of the fat content of the diet is usually recommended, but local treatment is omitted. After all evidences of psoriasis have completely cleared, a small maintenance dose of sarsaparilla is recommended in some instances, but in other cases, all treatment is stopped and recurrence does not take place.

Impressive results have been reported in patients treated by this method. Severe cases of psoriasis of from five to eighteen years' duration have recovered remarkably following this treatment, according to the work of Deneke.<sup>8</sup> Excellent results comparable to those reported by Deneke were reported in the summer of 1938 by Zaun,<sup>9</sup> who studied and treated 20 cases by the same method. He administered five to thirty tablets of sarsaparilla daily with large amounts of fluid, a low-fat diet and a simple salicylic acid ointment applied locally. Satisfactory results were obtained in all the cases except in a few in which the patients did not follow treatment regularly.

The use of vitamin D in the treatment of psoriasis seems logical because of the known response of many cases to natural sunshine and to artificial ultraviolet radiation. However, the doses of vitamin D found to be useful in psoriasis are so extremely large that the method cannot be recommended without a note of warning. Vitamin D is the only vitamin known to be capable of doing harm. In rabbits it causes calcification of the arteries, and there is evidence that similar changes may take place in the human arterial system under the same circumstances.

The effects of massive doses of crystalline vitamin D on 15 men with extensive psoriasis were described by Ceder and Zon.<sup>10</sup> In 11 cases the cutaneous lesions cleared in twelve weeks and no unfavorable reaction was noted following administration of average daily doses of 300,000 U.S.P.

units of vitamin D. In an effort to confirm these results, Brunsting<sup>11</sup> studied 19 cases of psoriasis. Except for 3 of these the condition was of long duration, resistant to treatment and subject to frequent recurrences. Brunsting employed vitamin D in the form of Ertron, and used 300,000 U.S.P. units daily. The only local application was petrolatum. Treatment was carried out during the fall and winter months, when psoriasis is less subject to spontaneous involution. Vitamin D in these doses was apparently well tolerated. In fact, in most cases during the early weeks of treatment there was an added sense of well-being. In 2 there was slight elevation of blood calcium associated with nausea and headache, but these symptoms disappeared after treatment was discontinued for a week or two. Of these 19 cases so treated, excellent results were obtained in 10. Three cleared completely, and 7 were markedly improved in from two to seven months.

In evaluating this method of treatment it must be borne in mind that definite danger is involved in the administration of vitamin D in large doses to human beings over a long period of time. Among children especially, the procedure should be used with the utmost caution.

#### ACNE VULGARIS

The emotional and social development of young people of either sex may be affected materially by the embarrassing if not disfiguring effects of conspicuous degrees of acne. Too often the parents of these youngsters are advised to do nothing and are urged to allow their children merely to outgrow the disturbance. Acne may not disappear spontaneously until the age of twenty-six years or later. Even without resorting to expensive dermatological care with x-ray and frequent office visits, much can be accomplished in moderating the effects of acne by means of simple home procedures including facial and scalp hygiene, dietary measures, local applications to the scalp and face, regulation of the bowels, proper use of soap and water, and so forth.

A suitable facial lotion which may be applied once or twice daily is the following:

R. Phenol	3 00
Camphor	2 40
Sulfur (precipitated)	2 00
Calamine	4 00 to 10 00
Zinc oxide	4 00 to 10 00
Alcohol (95%)	30 00
Glycerin	8 00
Water	q. s. ad 240 00

If this should prove to be too drying, it may be diluted with equal parts of water.

\*Manufactured as Sarsapar by Johannes Bürger's Fabrik, Wernigerode.

determined more by the state of the skin than by the cause of the eruption. In infantile eczema the most promising therapeutic approach is that which is directed against the presenting manifestation, such as the removal of crusts and scales, the combating of infections, the soothing of irritations, the alleviation of itching and the prevention of scratching.

The most practical point of view for both physician and mother is that which regards infantile eczema as a result of maladjustment of the skin to the radical changes of environment which occur when the baby is born. The skin is the most delicate and the most exposed organ, and it is that organ which has to the greatest degree the function of protecting the individual from the outside world and of adapting him to his environment. All the new substances of the outside world including dust, feathers, wool, silk, animal emanations, cleansing agents, soaps, and so forth, begin their onslaught. The various physical forces such as heat, cold, light, moisture, friction and pressure all require cutaneous adjustment. Hordes of living micro-organisms including fungi, bacilli, cocci and viruses begin to settle on the surface of the skin and take up their activities there, and these must be controlled and resisted. In addition to all these external attacks, the skin must learn to cope with the products of digestion which are brought to it in the blood stream, and to adjust itself to substances absorbed by inhalation. Furthermore, the skin must adapt itself to the products emanating from new foci of internal and external infection.

In treatment, therefore, the eczematous baby should be protected so far as possible from the violence of these varied onslaughts. The temperature of the room and of the entire environment should be kept even (about 68°F). The clothing should be light, soft and cool, and next to the skin smooth cotton or linen should always be used in preference to woolen or other rough material. The baby's skin should be kept clean and soft, and this must be accomplished without the use of soap. If there is one point on which all authors agree, it is this. Except on the scalp, soap is "poison" for most infantile eczemas. Care should be taken to see that no soap remains in the clothing or bed linen, thorough and repeated rinsing of all garments and linen is essential. Instead of soap's being used, the child should be bathed with tepid water to which starch, oatmeal or tar has been added, it is surprising how well one can clean a child by such means.

Eczematous skins are almost always sensitive to friction and to alkalis, and the diapers must

therefore always be soft, clean, loose and free from every trace of soap. Rubber pants and the like should be dispensed with. The effects of ammoniacal stool and urine must be prevented, and this is most readily accomplished by rinsing the diapers, after washing, with a mildly acid and antiseptic solution. In most instances it is sufficient to soak the diapers in a saturated solution of boric acid.

If after a reasonable trial any case of infantile eczema proves refractory to topical measures, it is advisable to undertake the elimination, one by one, of such potential common dietary causes as cow's milk, wheat, eggs, citrus fruits, spinach, peas, tomatoes, fish and fish products, named in their approximate order of importance. In regard to diet, the approach to this subject by means of a carefully taken history, the close observation of the effects of elimination and re-exposure to certain foods and the constant awareness that a few foods are notorious offenders will as a rule prove more successful than reliance on results of hundreds of cutaneous tests.

Environmental allergens such as house dust and the substances coming from pillows, mattresses, bedding, rugs, draperies and dyed and colored objects may be of great significance in certain cases of infantile eczema. It is therefore expedient to remove all sources of such dust. No feathers, Kapok mattresses, overstuffed furniture, rugs or draperies should be present. The room should be as bare as a barracks, with washable walls and floors if possible. An iron cot with a sterilized horsehair mattress and plain, painted wooden chairs should constitute the bedroom furniture. If Kapok or feathers cannot be removed, the mattress, pillows or other articles containing these allergens should be covered with a so-called allergen-proof cover.

In the matter of reassuring parents, Sulzberger mentions several points of considerable helpfulness.

- 1 The baby will almost certainly get over the cutaneous disorder. In most cases, there is spontaneous cure at about the age of two years or before.
- 2 No marks and no scars will be left by the eruption. The child's skin has every prospect of eventually being as perfect as that of any other child.
- 3 The cutaneous condition is not contagious.
- 4 The baby is a healthy one. The general health and the nutrition will not suffer because of the eczema.
- 5 There is practically no danger whatsoever of blood poisoning in spite of all the scratching.
- 6 The baby is not really suffering to the extent to which it appears to be. When it gets over this trouble no general impairment of health will remain, and no memory of the episode will persist.

The commonest forms of pruritus ani are due to fungous infections, seborrheic dermatitis and psoriasis. For practical purposes, all three of these types may be treated by identical methods. The perianal skin changes in this group are too familiar to require description, and consist of varying mixtures of erythema, scaling, maceration, excoriation and fissuring.

The practitioner will meet with far greater success in treating pruritus ani if he remembers that fecal staining is always an exciting factor of importance. Small amounts of fecal material left in the skin folds after defecation and the particles deposited after passing gas are capable alone of causing marked itching. Irritation from fecal material probably not only serves to stir up and aggravate perianal fungous infections but may prepare the soil for the original inoculation. Therefore in treatment rigid cleanliness is essential. Careful instructions should be given to cleanse the area with olive oil and Kleenex following each bowel movement, and also following episodes of passage of gas per rectum during the day. This latter point cannot be stressed too strongly.

Lilienthal<sup>19</sup> has outlined a very successful form of treatment which seems to be based almost entirely upon the simple principle of protecting the anal region against contamination with fecal matter. The affected parts are thoroughly cleansed at the start with any of the noninflammable grease solvents and the area is allowed to dry. The fissures and folds of the area are thoroughly filled with some bland substance such as ordinary zinc oxide ointment. The patient is then instructed to apply a thick coating of zinc ointment before each evacuation. In this way, the fecal material is prevented from coming in contact with the affected area of skin, and after the movement the stains may be easily removed with soft paper. After the inflammatory changes have subsided, a lighter type of ointment may be used as a prophylactic to replace the heavy zinc ointment mixture. A high percentage of success has been reported from the use of this simple and very plausible type of treatment.

The commonest error in treating pruritus ani lies in the use of excessively strong antiseptic applications. Whitfield's ointment and its commercial imitations (Kerolysin) contain 6 per cent salicylic acid and 12 per cent benzoic acid, and are much too corrosive for the sensitive anal region, in the average case. More suitable local remedies include permanganate (1:10,000 dilution) wet dressings, ointments containing 1 to 3 per cent salicylic acid, 1 to 3 per cent sulfur, 3 per cent pine tar ointment (U.S.P.), 5 to 10 per cent ammoniated mercury, 6 per cent crude coal tar or

5 to 10 per cent Supertah, and many others. The use of crude coal tar ointment is a "messy" type of treatment but is one of the best.

To be highly recommended in the treatment of pruritus ani is the following formula (Foerster's groin ointment)

R	Salicylic acid	2.00
	Sulfur ointment (U.S.P.)	2.00
	Pine tar ointment (U.S.P.)	2.00
	Aquaphor (Duke)	q s ad. 60.00

This may be applied directly to the affected area, morning and night.

It is well to keep in mind that all fungicidal remedies for pruritus ani are potential allergens, and that their use is complicated frequently by varying degrees of chemical dermatitis, which may serve to aggravate the condition considerably. The patient should be warned of this possibility so that his confidence will be preserved, and alternative forms of treatment substituted if necessary.

X-ray is sometimes an indispensable aid in the therapy of pruritus ani, and ultraviolet light proves to be of value in occasional cases. Neither x-ray nor lamp should, however, be used to the exclusion of anal hygiene and properly selected local applications.

#### INFANTILE ECZEMA

In the management of infantile eczema, Sulzberger<sup>20</sup> has presented a highly practicable and simplified conception along with many clear-cut suggestions regarding treatment. Sulzberger considers that the expert should be able to differentiate eight different forms of eczematoid dermatoses, but he expressed doubt whether the general practitioner will, in the present rudimentary state of knowledge in this field, derive much value in attempting to distinguish between the various forms of eczematoid dermatitis in children below the age of two years. There are several good reasons for this, including the fact that the infantile eczematoid eruptions do not as a rule present the typical distributions which constitute such important aids in the differential diagnosis of the adult form. In addition, the tendencies toward vesiculation and weeping, which are almost pathognomonic of adult contact type of dermatitis, and which are completely absent in the uncomplicated atopic type and seborrheic dermatitis in adults, are likely to be present in all forms of infantile eczema.

Sulzberger considers that, from the purely practical viewpoint, the physician will be more successful if he discards theory and, for the present at least, regards infantile eczema as a cutaneous eruption to be managed as a single disease, and he advises that the dermatological treatment be



determined more by the state of the skin than by the cause of the eruption. In infantile eczema the most promising therapeutic approach is that which is directed against the presenting manifestation, such as the removal of crusts and scales, the combating of infections, the soothing of irritations, the alleviation of itching and the prevention of scratching.

The most practical point of view for both physician and mother is that which regards infantile eczema as a result of maladjustment of the skin to the radical changes of environment which occur when the baby is born. The skin is the most delicate and the most exposed organ, and it is that organ which has to the greatest degree the function of protecting the individual from the outside world and of adapting him to his environment. All the new substances of the outside world including dust, feathers, wool, silk, animal emanations, cleansing agents, soaps, and so forth, begin their onslaught. The various physical forces such as heat, cold, light, moisture, friction and pressure all require cutaneous adjustment. Hordes of living micro-organisms including fungi, bacilli, cocci and viruses begin to settle on the surface of the skin and take up their activities there, and these must be controlled and resisted. In addition to all these external attacks, the skin must learn to cope with the products of digestion which are brought to it in the blood stream, and to adjust itself to substances absorbed by inhalation. Furthermore, the skin must adapt itself to the products emanating from new foci of internal and external infection.

In treatment, therefore, the eczematous baby should be protected so far as possible from the violence of these varied onslaughts. The temperature of the room and of the entire environment should be kept even (about 68°F). The clothing should be light, soft and cool, and next to the skin smooth cotton or linen should always be used in preference to woolen or other rough material. The baby's skin should be kept clean and soft, and this must be accomplished without the use of soap. If there is one point on which all authors agree, it is this. Except on the scalp, soap is "poison" for most infantile eczemas. Care should be taken to see that no soap remains in the clothing or bed linen, thorough and repeated rinsing of all garments and linen is essential. In stead of soap's being used, the child should be bathed with tepid water to which starch, oatmeal or tar has been added, it is surprising how well one can clean a child by such means.

Eczematous skins are almost always sensitive to friction and to alkalis, and the diapers must

therefore always be soft, clean, loose and free from every trace of soap. Rubber pants and the like should be dispensed with. The effects of ammoniacal stool and urine must be prevented, and this is most readily accomplished by rinsing the diapers, after washing, with a mildly acid and antiseptic solution. In most instances it is sufficient to soak the diapers in a saturated solution of boric acid.

If after a reasonable trial any case of infantile eczema proves refractory to topical measures, it is advisable to undertake the elimination, one by one, of such potential common dietary causes as cow's milk, wheat, eggs, citrus fruits, spinach, peas, tomatoes, fish and fish products, named in their approximate order of importance. In regard to diet, the approach to this subject by means of a carefully taken history, the close observation of the effects of elimination and re-exposure to certain foods and the constant awareness that a few foods are notorious offenders will as a rule prove more successful than reliance on results of hundreds of cutaneous tests.

Environmental allergens such as house dust and the substances coming from pillows, mattresses, bedding, rugs, draperies and dyed and colored objects may be of great significance in certain cases of infantile eczema. It is therefore expedient to remove all sources of such dust. No feathers, Kapok mattresses, overstuffed furniture, rugs or draperies should be present. The room should be as bare as a barracks, with washable walls and floors if possible. An iron cot with a sterilized horsehair mattress and plain, painted wooden chairs should constitute the bedroom furniture. If Kapok or feathers cannot be removed, the mattress, pillows or other articles containing these allergens should be covered with a so-called allergen-proof cover.

In the matter of reassuring parents, Sulzberger mentions several points of considerable helpfulness.

- 1 The baby will almost certainly get over the cutaneous disorder. In most cases, there is spontaneous cure at about the age of two years or before.
- 2 No marks and no scars will be left by the eruption. The child's skin has every prospect of eventually being as perfect as that of any other child.
- 3 The cutaneous condition is not contagious.
- 4 The baby is a healthy one. The general health and the nutrition will not suffer because of the eczema.
- 5 There is practically no danger whatsoever of "blood poisoning" in spite of all the scratching.
- 6 The baby is not really suffering to the extent to which it appears to be. When it gets over this trouble, no general impairment of health will remain, and no memory of the episode will persist.

Statements of this type will often pave the way to cure by reassuring the members of the distressed family so that they become of valuable assistance in the further management of the case

#### VITAMINS AND THE SKIN

The skin, which carries a storage of vitamins A, C, D and possibly B<sub>2</sub>, may reflect the earliest clinical signs of vitamin deficiency, a fact worth bearing in mind in this age of vitamin enthusiasm. For example, the dryness, scaliness and other cutaneous changes characteristic of vitamin A deficiency may appear before the onset of night blindness or xerophthalmia. So much attention has been focussed recently upon the vitamins, in relation to health and diseases, that it is worth while to know what the skin teaches us about this interesting subject. Recent reports concerning vitamins and the skin have come from Youmans and Corlette<sup>21</sup> concerning vitamin A and from Goodman,<sup>22</sup> who has made an extensive review of the literature

#### *Vitamin A Deficiency*

In vitamin A deficiency the skin undergoes quite distinctive alterations. Some cases show a dry, horny condition with peculiar conical papules arising at the sites of the hair follicles and involving particularly the thighs, arms and buttocks. These changes completely disappear following the administration of cod-liver oil or haliver oil. In other cases, an acneiform papular eruption involving chest, back, arms and shoulders may dominate the picture. Comedones of the face may appear, but these are more keratotic than in true acne. Pustulation is rare except as a late manifestation. The fingernails and toenails may undergo changes including lack of luster and brittleness. The acneiform disturbances and the nail changes may be corrected by vitamin A therapy in the form of either haliver oil or cod-liver oil.

#### *Vitamin B<sub>2</sub>(G) Deficiency*

The dermatitis of pellagra is brought out by the action of sunlight on the exposed areas of the skin, including face, neck, wrists and backs of hands, in subjects who have subsisted on a prolonged, grossly deficient diet. The areas affected become brightly erythematous and present sharp lines of demarcation. Thickening, desquamation and pigmentation develop later. The symptoms of pellagra are relieved by the administration of brewer's yeast, liver extract or nicotinic acid combined with a liberal and well-balanced diet.

#### *Vitamin C Deficiency*

In scurvy, the capillary walls become fragile and hemorrhages occur with ease. Swollen gums, ecchymoses and purpuric and hemorrhagic tendencies become evident. In both vitamin A and vitamin C deficiency follicular hyperkeratosis occurs, and the early follicular lesions in these two conditions are indistinguishable. In more advanced stages, however, the hyperkeratosis of the hair follicles in scurvy may be distinguished by perifollicular hemorrhages. Follicular hyperkeratosis may be the first recognizable sign of the scorbutic tendency, and may permit diagnosis before the onset of other scorbutic symptoms.

All symptoms of scurvy, including the pigmentation seen in occasional cases, may be relieved quite promptly by the administration of orange juice, lemon juice, tomato juice and other rich sources of vitamin C. Cevitamic acid, the crystalline form of this vitamin, may also be used.

Of great interest is the convincing literature which has accumulated in the last few years concerning a relation between vitamin C and hypersensitiveness to arsphenamine.<sup>23</sup> In the treatment of exfoliative dermatitis due to arsenical therapy, vitamin C has been employed with success far surpassing the older methods used in this troublesome ailment. The evidence is that vitamin C should be employed routinely in large dosage as an adjunct in arsphenamine therapy.

#### *Other Vitamins*

The relations between vitamins B<sub>1</sub>, E and F and the skin are at present so ill defined clinically as to merit no special mention in this summary.

In the treatment of acne, psoriasis and pemphigus, vitamin D seems to be of value if employed in large dosage. There is little clear-cut evidence, however, that deficiency of vitamin D is of importance in the etiology of these diseases.

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# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25191

### PRESENTATION OF CASE

A sixty-nine-year-old married Italian woman was admitted complaining of swelling of the legs and shortness of breath.

She was born in Italy and had lived there for fifty years in good health. Fifteen years prior to admission, approximately at the time of coming to Boston, she developed a chronic cough which was productive of a small amount of white phlegm. The cough was noticed especially in the morning. It was never blood streaked. She saw numerous physicians without relief. There was no weight loss, weakness, anorexia or fever. At times the coughing attacks lasted until her skin became blue. One and a half years before entry she noticed shortness of breath following activity, and swelling of her legs after standing, for which she was treated with "red capsules." The attacks which resulted in her becoming blue returned at that time. She resumed normal activity after three weeks. During the previous year she had noticed shortness of breath on climbing stairs, and at times her legs became markedly swollen at night, the swelling disappearing in the morning. Six weeks before admission she had had an attack of shortness of breath in the morning to the extent that she could not speak. During the previous four weeks, without evident cold, sore throat or infection, she became progressively bluer. Her legs became swollen and she went to bed, but in bed her abdomen and buttocks became swollen. Her cough persisted. She gained about 30 pounds in weight. During the previous three weeks she had been given two pills of digitalis daily for one week, followed by one pill daily for two weeks. "Brown pills" and Salyrgan injections were also given, which increased her urinary output.

Physical examination showed a large, blackly cyanotic, orthopneic woman in acute distress, with short rapid shallow respirations. The cyanosis involved the face, neck and hands. The superficial veins were markedly distended, especially those of the neck which showed also a deep sustained venous pulse. The heart was enlarged to the left anterior axillary line and 4.5 cm. to the right of the midline. There was a prominent pulsation in the pulmonic area, with systolic and diastolic

shock. P<sub>2</sub> was much louder than A<sub>2</sub>. There was a faint systolic apical blow, and a faint third sound. The rate was regular at 80. The blood pressure was 136 systolic, 70 diastolic. The lungs were resonant but full of moist rales and rhonchi, especially in the lower lobes. The liver was enlarged to about 10 cm. below the right costal margin. The chest was not barrel-shaped, but was fairly large, consistent with her large build. There was a definite fluid wave in the abdomen, and edema up to the waist. Rectal and pelvic examinations were negative.

The temperature was 99.5°F, rectally, the pulse 70, and the respirations 30.

Examination of the urine was negative except for 8 to 10 white cells per high-power field. The blood showed a red-cell count of 6,610,000 with 110 per cent hemoglobin, and a white-cell count of 7300 with 76 per cent polymorphonuclears. Blood Hinton and Wassermann tests were not done. An electrocardiogram showed low T waves in all four leads. QRS<sub>1</sub> and QRS<sub>2</sub> were slightly slurred, ST<sub>3</sub> sagging. There was right axis deviation.

After arrival on the ward from the Emergency Ward it was thought that she tried to indicate pain over her heart. Following this her pulse dropped to 56. On the second hospital day her circulation time (arm to medulla, lobelin method) was 30 seconds (normal, 15 seconds). The venous pressure was 270 mm. of water. Digitalis and Salyrgan had no obvious effects. An oxygen tent partly relieved the cyanosis, but she continued rapidly downhill, became unconscious and died three days after admission.

### DIFFERENTIAL DIAGNOSIS

DR. DONALD KING. The clinical picture in this case seems clear. In the first place, there is right-sided cardiac failure of extreme degree, with all the signs that go with that condition. In the second place, the right-sided failure is probably due to gross changes in the pulmonary vascular bed. I cannot think of any other lesion which would give the pulsation in the pulmonary area, with the double shock and the very marked or black cyanosis. In the third place, I know of only three conditions which would so obstruct the pulmonary vessels. Of course, we have to think of Ayerza's disease, but this patient was sixty-nine years old and I do not believe that patients with obliterating arteritis, which we mean when we speak of Ayerza's disease, would live to be that old. I do not believe that in this case a syphilitic infection or any other specific etiologic factor is producing obliteration of the arteries. That leaves only extensive thrombosis or multiple emboli, and my

diagnosis will be multiple pulmonary emboli, with probable thrombi and infarcts

To go a little farther, what possible conditions would be associated with such vascular changes? We should like to find something to explain them. We have no evidence of phlebitis in the peripheral vessels. There is no evidence of anything wrong in the heart, except the cor pulmonale with right-sided failure. There is no indication of coronary thrombosis, valvular disease, hypertensive heart disease, constrictive pericarditis or a congenital heart lesion. There is no fibrillation, and no proof that there are mural thrombi. So far as the lungs go, we have the story of a morning cough for fifteen years. There is nothing in the history or physical examination to warrant the diagnosis of emphysema. A true cor pulmonale is usually associated with emphysema, particularly if chronic bronchial infection is present. We have then no evidence of cardiac or pulmonary lesions, and all we know is that there are marked changes in the pulmonary vessels. You may remember that a year ago Dr. Means discussed a similar case.\* To complete the picture I shall assume that the autopsy showed phlebitis, perhaps in the popliteal or pelvic vessels. I shall assume that the heart was negative and that the lungs showed multiple emboli with thrombi and multiple small pulmonary infarcts. I do not know why the record should stress the fact that a Wassermann test was not done, in any case, I shall throw out the possible diagnosis of syphilis.

DR. TRACY B. MALLORY: Does anyone want to disagree or to hazard another diagnosis?

DR. KING: I might say that in this case we have to make the diagnosis of pulmonary emboli and infarcts without a source that can be demonstrated, —without pain, without hemoptysis and without fever,—but we have had such cases. I do not see how we can make any other diagnosis.

I did not see the x-ray film.

DR. MALLORY: You are welcome to it.

DR. KING: I am at a loss to explain the fifteen years' cough, and this x-ray film does not help. I believe that there was some clinical emphysema. Perhaps early stages of cardiac failure would explain the cough. In Dr. Means's case, which I looked up today, the patient had had cough for many years and repeated attacks of bronchitis, so-called, yet the postmortem showed no change in the lungs.

DR. J. H. MEANS: There is another case that Dr. Mallory and I reported years ago. At postmortem there was a thrombosis in the pulmonary artery which completely occluded one main branch. The

circulation of the lung had been taken care of by a bronchial artery as big as my little finger. There was marked cyanosis.

DR. KING: As black as in the present case?

DR. MEANS: Not quite.

DR. KING: The cyanosis seems to have been the most marked that we have ever seen in cases of pulmonary emboli.

DR. MEANS: I should like to raise the question, and have Dr. Mallory comment, as to whether there is any extravascular lesion which could impinge on the pulmonary artery in any fashion so as to give cyanosis such as this.

DR. MALLORY: I do not remember ever having seen one.

DR. KING: I tried to bring carcinoma into this picture but could not.

DR. RICHARD SCHATZKI: You may be glad you did not have the advantage of the x-ray interpretation.

DR. KING: I did not insist on it.

DR. SCHATZKI: We do not have any antemortem films. These films were taken after the patient died. The heart appears to be enlarged, but the appearance of the heart in postmortem films is absolutely unreliable, though I think that the heart was enlarged. There are definite changes in the right lower lung field, it is dense. In the lateral view there is additional evidence of a lesion in the right lower lobe and possibly the right middle lobe. This may be collapse.

DR. KING: Could it be infarct?

DR. SCHATZKI: Yes, that is what I was going to say,—a large infarct with collapse. It could be pneumonia with collapse. Whatever it is, I think it is something with marked decrease of aeration of this lobe. I do not try to interpret the vascular changes on postmortem films. The appearance of the pulmonary vessel on this film is consistent with pulmonary stasis. That is all one can say. I cannot see any calcified pulmonary vessels.

DR. KING: What about the pulmonary conus?

DR. SCHATZKI: I refuse to make any statement from the postmortem film. There is marked arteriosclerosis of the aorta if that is of any help to you.

DR. KING: You would accept pulmonary infarct?

DR. SCHATZKI: As a possibility?

DR. KING: Yes.

DR. SCHATZKI: This type of pulmonary infarct would not explain the clinical picture, would it? If this is pulmonary infarct it has come within the last few weeks.

DR. CHESTER M. JONES: Would it explain the fifteen years of cough?

DR KING Has she any evidence of emphysema?

DR. SCHATZKI No gross emphysema The films must be taken at the end of inspiration in order to see that

DR KING She has no blebs that you can see?

DR SCHATZKI Definitely not, I should say

DR MEANS What do postmortem x-rays show in emphysema? Does the emphysema disappear?

DR SCHATZKI I have not seen enough to say

DR BENJAMIN CASTLEMAN The emphysema remains

DR SCHATZKI So emphysema is out, I should say

#### CLINICAL DIAGNOSES

Pulmonary endarteritis

Pulmonary fibrosis

#### DR KING'S DIAGNOSES

Multiple pulmonary emboli with associated thromboses and pulmonary infarcts

Probable phlebitis in popliteal or pelvic veins

#### ANATOMICAL DIAGNOSES

(Ayerza's disease)

Idiopathic cor pulmonale

Cardiac cirrhosis of liver

#### PATHOLOGICAL DISCUSSION

DR MALLORY The postmortem examination is not going to explain this case We found, of course, a cor pulmonale The left side of the heart was normal in size, but the heart as a whole was greatly hypertrophied, weighing 500 gm, that hypertrophy was almost exclusively due to dilatation and hypertrophy of the right ventricle The latter was about four times as large as normal in volume, and in spite of the extreme dilatation its wall was 5 to 6 mm in thickness If a ventricle of that size were contracted, the muscle would certainly measure at least 15 mm, quite as thick as that of the left ventricle The lungs were normal in size There was no trace of blebs or emphysema that could be made out in gross The pulmonary arteries were empty There were no thrombi or emboli, no areas of infarction The larger pulmonary arteries appeared definitely dilated and showed numerous bright-yellow atheromatous plaques As one progressed downward, the atheromatous plaques disappeared, but the dilatation continued as far as we could see the vessels grossly On microscopic examination the pulmonary arterioles were absolutely normal in size and thickness The atheromas did not extend down beyond the major branches There were small areas in the upper lobes where there was

a slight amount of emphysema microscopically but not more than most people would consider normal for an individual approaching seventy years of age Anyone at that age, of course, shows larger alveoli than does an individual of twenty or thirty So I do not see how we can make a diagnosis of emphysema The bronchi were not dilated, there was no bronchiectasis, just a minimal chronic inflammatory infiltration There was a terminal pneumonia

A PHYSICIAN No phlebitis elsewhere?

DR. MALLORY No

DR MEANS Do you think the diameter of the pulmonary circuit was all right?

DR MALLORY It was larger than normal

DR. ALLEN G BRAILEY What was the nature of the lesion Dr Schatzki pointed out?

DR. MALLORY A terminal pneumonia in the right lower lobe

A PHYSICIAN Was there any epithelium in the alveoli of the lungs?

DR MALLORY In a normal lung one never sees epithelium in the alveoli, and we did not see any here We cut many sections I am sure I looked at slides from fifteen blocks We also examined a large amount of alveolar tissue which was cut with very thick sections that allow one to look down on the surface of the alveoli and so enable one to estimate quite accurately the vascularity of the alveolar walls These were as vascular as I have ever seen Certainly no diminution in the capillary bed could be made out

A PHYSICIAN Was there any abnormal thickness of the interstitial supporting tissue?

DR MALLORY There was the average amount of interstitial alveolar tissue, nothing more

DR A THORNTON SCOTT Is it possible it could be explained by pulmonary hypertension?

DR. MALLORY It seems to be the only possible solution, but I do not know any way of proving that anatomically I have seen an identical picture in a case that we reported as Ayerza's disease in a twelve-year-old girl She also had black cyanosis, with a marked cor pulmonale, perfectly normal lungs, atheromas in the major arteries, but no obstructive vascular lesions whatever This syndrome occurs without any question

DR KING At this age?

DR MALLORY No I should think that that is quite unusual

DR MEANS Could the atheromatous process interfere with the elasticity of the artery sufficiently to cause an embarrassment, hemodynamically speaking, to the flow of blood through the pulmonary circuit?

DR. MALLORY There is little direct relation be-



tween atheroma and elasticity of arteries. With progressive age the elasticity of the arteries diminishes regardless of atheromatous changes, and one can have severe atheromatosis in younger individuals with well-maintained elasticity. We did not actually test the elasticity of the pulmonary vessels. So far as the microscope can help, there was a normal amount of elastic tissue in the pulmonary arteries. The changes are merely superficial ones in the intima and do not involve the media at all.

DR HOWARD B SPRAGUE: Was there any suggestion of trouble in the pulmonary veins?

DR. MALLORY: No, I looked carefully for that because by exclusion it seemed that if there were an anatomical cause it had to be found there.

DR SIEGFRIED THANNHAUSER: There was no thickening of the heart valves?

DR MALLORY: None whatever. The tricuspid ring was quite dilated; it is true, and I cannot say that there was not some degree of relative insufficiency and regurgitation there.

I neglected to mention that the liver showed an extreme grade of chronic passive congestion, including a definite central sclerosis, this justified a diagnosis of cardiac cirrhosis.

DR ALBERTO C TAQUINI: It is natural that interest in Ayerza's disease has remained very lively in South America and particularly in Buenos Aires. Bullrich and Behr<sup>1</sup> in 1925 suggested that the vascular changes seen in Ayerza's disease were probably secondary to pulmonary hypertension. In a series of experimental studies between 1930 and 1932, Ayerza, Solari and Berconsky,<sup>2</sup> Arrillaga, Berconsky and Taquini,<sup>3</sup> and Houssay and Berconsky<sup>4</sup> showed that in Ayerza's disease the oxygen tension in the alveolar air is definitely lower than normal. Their findings closely parallel those of Dautreband, Davies and Meakins<sup>5</sup> in a study of emphysema. They were able to show that cyanosis develops only when the alveolar oxygen tension drops below 80 mm of mercury. Since the oxygen content of the blood is the same as that of the alveolar air, they believe very strongly that the primary disease is due to a hypoventilation of the alveolar air, that is, to some primary malfunction of the lung parenchyma, not to disease of the circulatory system. They divide the disease into three stages: (1) bronchial—chronic bronchitis of some type which these patients almost invariably have, (2) pulmonary—extension of the disease around the bronchi and spread to the lungs producing fibrosis and emphysema, and (3) circulatory—secondary changes in the arterioles which may intensify the circulatory obstruction developing in the second stage and eventually lead to right heart failure.

DR MALLORY: I am sure we are grateful to Dr Taquini for this information from Ayerza's own clinic. I can only say that in this case I found very little anatomic evidence of chronic bronchitis and certainly no bronchial stenosis. I have no anatomic evidence, therefore, to explain a primary hypoventilation of the alveoli. Conceivably this could develop from faulty breathing habits and it has indeed been claimed that functional polycythemia may appear under such conditions and disappear later when the patient has been re-educated to proper breathing habits. We have, however, no positive evidence to point to any such mechanism here.

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## CASE 25192

### PRESENTATION OF CASE

*First Admission*—A fifty-four-year-old married Italian entered complaining of right flank pain and hematuria.

Six weeks before admission the patient had passed some bright-red urine. He had had no pain, but two hours later passed more red urine, immediately following which he was seized with a sudden, severe pain in the right testicle which radiated up through the right groin into the lumbar region where it persisted, causing the patient to double up and roll around. He was relieved by pills prescribed by his physician. Anorexia and nausea were noted, and he vomited once. Following the attack he had urinary frequency and burning. The hematuria persisted for about twenty-four hours, but a residual soreness remained in the right lumbar area for about ten days. One week before entry he passed bloody urine twice, unaccompanied by pain. Four days later he passed some thick, red urine, immediately after which there was a sudden severe pain in the right lumbar region which persisted throughout the night. The hematuria continued until entry. Frequency, dysuria and straining were present and he passed only small amounts of bloody urine, sometimes only a few drops. He had nausea but no vomiting.

Thirty years before admission he had had gonorrhea. Ten years later he was treated for syphilis.

DR KING Has she any evidence of emphysema?

DR SCHATZKI No gross emphysema. The films must be taken at the end of inspiration in order to see that.

DR KING She has no blebs that you can see?

DR SCHATZKI Definitely not, I should say.

DR MEANS What do postmortem x-rays show in emphysema? Does the emphysema disappear?

DR SCHATZKI I have not seen enough to say.

DR BENJAMIN CASTLEMAN The emphysema remains.

DR SCHATZKI So emphysema is out, I should say.

#### CLINICAL DIAGNOSES

Pulmonary endarteritis

Pulmonary fibrosis

#### DR KING'S DIAGNOSES

Multiple pulmonary emboli with associated thromboses and pulmonary infarcts  
Probable phlebitis in popliteal or pelvic veins

#### ANATOMICAL DIAGNOSES

(Ayerza's disease.)

Idiopathic cor pulmonale

Cardiac cirrhosis of liver

#### PATHOLOGICAL DISCUSSION

DR MALLORY The postmortem examination is not going to explain this case. We found, of course, a cor pulmonale. The left side of the heart was normal in size, but the heart as a whole was greatly hypertrophied, weighing 500 gm, that hypertrophy was almost exclusively due to dilatation and hypertrophy of the right ventricle. The latter was about four times as large as normal in volume, and in spite of the extreme dilatation its wall was 5 to 6 mm in thickness. If a ventricle of that size were contracted, the muscle would certainly measure at least 15 mm, quite as thick as that of the left ventricle. The lungs were normal in size. There was no trace of blebs or emphysema that could be made out in gross. The pulmonary arteries were empty. There were no thrombi or emboli, no areas of infarction. The larger pulmonary arteries appeared definitely dilated and showed numerous bright-yellow atheromatous plaques. As one progressed downward, the atheromatous plaques disappeared, but the dilatation continued as far as we could see the vessels grossly. On microscopic examination the pulmonary arterioles were absolutely normal in size and thickness. The atheromas did not extend down beyond the major branches. There were small areas in the upper lobes where there was

a slight amount of emphysema microscopically but not more than most people would consider normal for an individual approaching seventy years of age. Anyone at that age, of course, shows larger alveoli than does an individual of twenty or thirty. So I do not see how we can make a diagnosis of emphysema. The bronchi were not dilated, there was no bronchiectasis, just a minimal chronic inflammatory infiltration. There was a terminal pneumonia.

A PHYSICIAN No phlebitis elsewhere?

DR MALLORY No.

DR MEANS Do you think the diameter of the pulmonary circuit was all right?

DR MALLORY It was larger than normal.

DR ALLEN G. BRAILEY What was the nature of the lesion Dr Schatzki pointed out?

DR MALLORY A terminal pneumonia in the right lower lobe.

A PHYSICIAN Was there any epithelium in the alveoli of the lungs?

DR MALLORY In a normal lung one never sees epithelium in the alveoli, and we did not see any here. We cut many sections. I am sure I looked at slides from fifteen blocks. We also examined a large amount of alveolar tissue which was cut with very thick sections that allow one to look down on the surface of the alveoli and so enable one to estimate quite accurately the vascularity of the alveolar walls. These were as vascular as I have ever seen. Certainly no diminution in the capillary bed could be made out.

A PHYSICIAN Was there any abnormal thickness of the interstitial supporting tissue?

DR MALLORY There was the average amount of interstitial alveolar tissue, nothing more.

DR A. THORNTON SCOTT Is it possible it could be explained by pulmonary hypertension?

DR MALLORY It seems to be the only possible solution, but I do not know any way of proving that anatomically. I have seen an identical picture in a case that we reported as Ayerza's disease in a twelve-year-old girl. She also had black cyanosis, with a marked cor pulmonale, perfectly normal lungs, atheromas in the major arteries, but no obstructive vascular lesions whatever. This syndrome occurs without any question.

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"The blood pressure was 152 systolic, 104 diastolic." He was a man of fifty-four and that might be high but perhaps not incompatible with his age. Nowadays one must think of renal hypertension, but I am not aware that it is necessarily accompanied by the symptoms about which we have been reading.

I should like to know what the rectal examination showed besides the hemorrhoids. There might have been something wrong with the prostate. It might have been nodular, irregular and large, or perhaps there was induration at the bladder base, which might help in saying that he had a carcinoma of the prostate or possibly a malignant neoplasm of the bladder.

The white-cell count would go with some urinary infection, probably due to urinary back pressure. He also had evidence of some trouble involving the right kidney. I should say that the disease from which he sought relief had not made much change in the kidney function, at least on one side. It certainly had not lowered the hemoglobin and red count much if at all, and the chemical findings in the blood show that the kidneys were functioning quite well, and I should say that the blood calcium and phosphorus are not indicative of hyperparathyroidism. The x-ray findings and the fact that, on cystoscopy, the right ureter was bulging indicate the possibility of a ureteral stone. However, it might have been a neoplasm, or a blood clot that came down to that point.

We then find that a catheter could be passed all the way up to the kidney without difficulty, a fact which suggests that the object seen in the x-ray film had disappeared. A blood clot for instance, might easily have gone to pieces and passed down the ureter, or it may have been a stone that was pushed back or went back into the kidney by retrograde peristalsis. It might still have been a neoplasm in the ureter. The fact that he had *Staphylococcus albus* in the urine implies that the first cystoscopy had introduced it because the urine was previously negative. That is not an

uncommon result. It might also be that the stone, if it were a stone, was there and that the ureter was dilated enough so that the catheter passed by without evidence of obstruction—a not uncommon finding.

These filling defects in the kidney pelvis might have been due to a stone or to a neoplasm of the pelvis of the kidney rather than one in cortical substance. These defects might also simply have been due to blood clots from previous hematuria.

The x-ray findings do not rule out, but help to rule out, the possibility of a cortical neoplasm. Such a growth would probably form a mass or a bulge of some sort in the kidney.

"In the lateral film the mass extended downward to the region of the middle calyx, and the calyx lay mainly posterior." That is hard to explain. The lesion might be due to stone or to a pelvic neoplasm such as I have described, or again it might be due to blood clot.

I have mentioned various things, and because I do not like to leave anything out, I should like to mention also the possibility of infarct of the kidney. Such a lesion is rare but is one which might produce some of the symptoms which we have read about. It is obvious that the trouble was in the right kidney, and I shall include also the right ureter. We have first to think of the possibilities of neoplasm, for a neoplasm of the pelvis of the kidney with blood clots would give some of the filling defects that are seen in the ureter and kidney pelvis. We have to think strongly of ureteral neoplasm, but the one case I have had personally and the other few I have heard about produced permanent obstruction to the passage of the catheter up the ureter. While I do not think this lesion can be ruled out I think it is unlikely. I believe we can rule out tuberculosis on the evidence at hand. I think we probably can rule out hemorrhagic nephritis. I cannot really exclude it because I remember one case which we mistook for one of kidney tumor. The patient had hematuria, pain, and so forth, the pain being due to blood clot which was retained in the kidney. So my diagnosis is (1) pelvic neoplasm with blood clots, (2) renal stone which at one time might have become ureteral, and (3) ureteral neoplasm, probably primary. Either of these three things—stone or neoplasm of the kidney pelvis or ureter—would account for the blood clots which would cause the filling defects that were described.

DR FLETCHER H COLBY. In discussing this case I ask you, in the first place, to notice that the patient had three admissions to the hospital, so we were in considerable doubt as to the diagnosis, even with the added information that we had from seeing the patient, doing the cystoscopic examinations and personally studying the x-ray films.

Ten years prior to entry he was treated in an outside hospital for bleeding peptic ulcer

Physical examination showed a well-developed and nourished man in no distress. Examination of the head and chest was negative. The blood pressure was 152 systolic, 104 diastolic. The abdomen was negative. There was slight costo-vertebral tenderness on the right. Rectal examination showed tender external hemorrhoids.

The temperature was 101°F., the pulse 100, and the respirations 20.

The urine showed a trace of albumin and contained many white cells and red cells, the specific gravity was 1.020, and culture showed no growth. A phenolsulfonephthalein kidney-function test was normal. The blood showed a red-cell count of 4,700,000 with 85 per cent hemoglobin, and a white-cell count of 6600. The nonprotein nitrogen of the blood serum was 35 mg per 100 cc, the sugar 101 mg, the calcium 10.46 mg, the phosphorus 3.84 mg and the uric acid 4.4 mg. A blood Hinton test was negative.

A retrograde pyelogram showed slight diffuse dilatation of the right kidney pelvis, calices and ureter. The ureteral dilatation ended abruptly just below the sacroiliac joint, where there was a rounded filling defect having the appearance of a stone. Three days later another retrograde pyelogram showed slight dilatation of the entire right ureter, but the rounded defect previously described was no longer visible. Cystoscopic examination on the day of admission showed a prominent reddened ureteral orifice on the right, and grossly bloody urine came from the right ureter.

On the fourth hospital day the patient was much improved. He had not complained of any acute symptoms since entry. Only an occasional red cell was seen in the urine. He was discharged on the eighth hospital day.

**Second Admission** (one month later). Three days after discharge he again had hematuria, with no associated pain. This promptly ceased, but three days later recurred. He then had intermittent hematuria until entry. He had had slight pain in the right costo-vertebral angle, but no severe paroxysm.

The physical examination showed no change since the previous admission.

On the second hospital day, cystoscopic examination showed slight injection of the trigone. A No. 6 catheter was easily passed to the right kidney, and bloody urine, soon followed by clear urine, was obtained. A culture of this showed *Staphylococcus albus*. He was discharged on the sixth hospital day.

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an occasional twinge of pain in the right flank. The physical examination was unchanged.

The temperature was 98, the pulse 80, and the respirations 20.

Urine examination showed a slight trace of albumin and 30 red cells per high-power field.

A retrograde pyelogram showed an abnormal upper calyx of the right kidney, characterized by a non-opaque filling defect 1.5 cm in diameter. This was surrounded by dye. The lower calyx showed a less marked, indefinite deformity. The ureter was normal.

On the third hospital day a retrograde pyelogram following peri-renal air injection on the right side showed the kidney outline very well demonstrated with no deformity. There was a mass in the region of the upper calyx which spread the latter apart. In the lateral film the mass extended downward to the region of the middle calyx and the calyx lay mainly posteriorly.

On the following day another retrograde pyelogram showed the same defect to be present. On the sixth hospital day an intravenous pyelogram with the film taken after blocking the ureter with a Dourmashkin bag showed increased density of the right kidney. There was no variation in the density in the region of the mass previously described. Its degree of opacity was the same as that of the remainder of the kidney. Only a minute amount of dye was visible in the pelvis.

On the ninth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

**DR J. DELLINGER BARNEY** With this story, so far as it goes, one can think of a number of conditions that might cause the symptoms which have been described. He might have had a neoplasm of the bladder, which can give hematuria without any other symptom. He might have had a tumor of the kidney which would explain some of the renal symptoms which he had and also the blood. He might have had a stone in the bladder which might account for the blood but probably not, it is not common with bladder stone to see diffuse hematuria and also there is usually a history of more or less long-continued urinary trouble, frequency, irritability, and so forth. He might have had a renal or ureteral calculus which might produce the bladder symptoms and the hematuria and readily account for the pain, as well as the nausea, vomiting, and so forth. He might have had primary neoplasm of the ureter which would cause obstruction, hematuria and colic and all the other symptoms he had. One should not leave out the possibility of tuberculosis of the kidney, although it does not sound

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I cannot see how the past history would have any definite bearing on the present trouble. The gonorrhea might possibly have resulted in a stricture of the urethra, but I do not believe that the stricture of the urethra in and of itself could cause the situation I have just read or that the bleeding peptic ulcer would influence the situation. We do not know what kind of ulcer it was. It might have been malignant, but that was ten years ago and, if it were malignant, I do not believe he would have been so well as he was when he came in.

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The white-cell count would go with some urinary infection, probably due to urinary back pressure. He also had evidence of some trouble involving the right kidney. I should say that the disease from which he sought relief had not made much change in the kidney function, at least on one side. It certainly had not lowered the hemoglobin and red count much if at all, and the chemical findings in the blood show that the kidneys were functioning quite well, and I should say that the blood calcium and phosphorus are not indicative of hyperparathyroidism. The x-ray findings and the fact that, on cystoscopy, the right ureter was bulging indicate the possibility of a ureteral stone. However, it might have been a neoplasm, or a blood clot that came down to that point.

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The x-ray findings do not rule out, but help to rule out, the possibility of a cortical neoplasm. Such a growth would probably form a mass or a bulge of some sort in the kidney.

'In the lateral film the mass extended downward to the region of the middle calyx, and the calyx lay mainly posterior.' That is hard to explain. The lesion might be due to stone or to a pelvic neoplasm such as I have described, or again it might be due to blood clot.

I have mentioned various things, and because I do not like to leave anything out, I should like to mention also the possibility of infarct of the kidney. Such a lesion is rare but is one which might produce some of the symptoms which we have read about. It is obvious that the trouble was in the right kidney, and I shall include also the right ureter. We have first to think of the possibilities of neoplasm, for a neoplasm of the pelvis of the kidney with blood clots would give some of the filling defects that are seen in the ureter and kidney pelvis. We have to think strongly of ureteral neoplasm, but the one case I have had personally and the other few I have heard about produced permanent obstruction to the passage of the catheter up the ureter. While I do not think this lesion can be ruled out I think it is unlikely. I believe we can rule out tuberculosis on the evidence at hand. I think we probably can rule out hemorrhagic nephritis. I cannot really exclude it because I remember one case which we mistook for one of kidney tumor. The patient had hematuria, pain, and so forth, the pain being due to blood clot which was retained in the kidney. So my diagnosis is (1) pelvic neoplasm with blood clots, (2) renal stone which at one time might have become ureteral, and (3) ureteral neoplasm, probably primary. Either of these three things—stone or neoplasm of the kidney pelvis or ureter—would account for the blood clots which would cause the filling defects that were described.

DR FLETCHER H COLBY. In discussing this case I ask you, in the first place, to notice that the patient had three admissions to the hospital, so we were in considerable doubt as to the diagnosis, even with the added information that we had from seeing the patient, doing the cystoscopic examinations and personally studying the x-ray films.

Dr Barney has had the help of none of these things. The x-ray diagnosis suggested the presence of stone in the ureter. One thing that is not in this history is that a waxed-tipped bougie was passed up the right ureter and no scratches obtained. That is a delicate diagnostic procedure, and I think almost never can a stone be present in the ureter and a waxed-tipped catheter be passed by without scratches being obtained. So we were certain that ureteral calculus could be eliminated and that, as Dr Barney shrewdly observed, it was blood clot in the ureter which had caused the filling defect. The diagnosis was not arrived at until the retrograde pyelograms were done, with perirenal infiltration of air around the kidney.

DR RICHARD C BATT I shall not take time to repeat what has already been said in the x-ray report. I shall just point out that the air injection around the kidney shows up very nicely, and here is the deformity in the pelvis, which is also very apparent. The urologists have studied these types of lesions much more thoroughly than I have.

DR COLBY Dr Oliver Cope and Dr Howard I Suby visualized the outline of the renal parenchyma very well, and there was no irregularity in outline of the upper pole of the kidney to suggest solid growth of the kidney itself. However, when the film was examined carefully it was easy to see a deformity of the upper calyx which was apparently due to compression and which we considered to be caused by a solid tumor of the upper pole of the kidney. I think it is only fair for Dr Barney to have a good look at the x-ray films.

DR GEORGE G SMITH May I make one remark? We really made the preoperative diagnosis very accurately in this case. In many of the pyelograms the lower half of the pelvis was obliterated, and yet with a good filling on retrograde pyelogram, the calices in the lower half

were intact. So we argued from that that there was an extension of growth down half the cortex of the kidney which must be pressing on the cavities of the kidney and which was held away from them by the retrograde injection. When the air injection was done we made a diagnosis of solid tumor involving the upper pole but also extending down through the cortex of the kidney.

#### CLINICAL DIAGNOSIS

Tumor of right kidney

#### DR BARNEY'S DIAGNOSIS

- (1) Tumor of pelvis of kidney
- (2) Renal calculus
- (3) Ureteral neoplasm

#### ANATOMICAL DIAGNOSIS

Renal-cell adenocarcinoma

#### PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The urological surgeons have of course the most elaborate and most accurate set of instruments and diagnostic measures for examining their patients of any specialists in medicine. The result is that their diagnoses are generally so accurate before operation that cases are seldom of much interest to discuss at clinics of this sort. It is the exceptional case where there is really a great deal of doubt at the time they decide to operate on their patient.

This man was operated on and at exploration it was possible to feel the definite tumor in the upper part of the kidney. The kidney was resected without difficulty. On section in the laboratory the clinical prognostications were completely fulfilled. There was a spherical mass in the upper pole from which extended a tongue-like projection downward through the cortical substance, two thirds of the way to the lower pole. At one point the upper calyx was invaded, this provided a source for the hemorrhage.



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## SYMPOSIUM ON VIRUS AND RICKETTSIAL DISEASES

STUDENTS of infectious disease are living, at the present time, in an era which is comparable in rapidity of discovery and intellectual adventure to that which transformed medicine in the period between Pasteur and Ehrlich. Ultramicroscopic virus agents have of course been known for a very long time—indeed, ever since the observation of tobacco mosaic in 1892 and the discovery of an invisible agent as the cause of foot and mouth disease in 1897. There was in the ensuing years a natural tendency among investigators to assume the possibility of filterable agents in almost all diseases which were obviously infections, but in which bacterial causation could not be determined. It was not until 1920 that the subject began to de-

velop precision, but in the subsequent nineteen years not only have innumerable diseases of animals and man been conclusively linked with virus causation, but special technics have been devised for virus study by which determination of size and chemical constitution was made possible. Methods of tissue culture have enabled investigators to study individual virus agents in the laboratory, their relations to tissue cells and to cell metabolism, and, to some extent, the immunological reactions they arouse in infected animals. The field has expanded in such a way that it now holds a place as important in medicine as bacteriology itself, and since many of the conditions now known to be caused by these ultramicroscopic agents are among the most important known epidemic diseases, there has developed, at the same time, a special epidemiology to which methods of virus investigation are applicable—not least important among them the problem of the curious preparatory relation of some virus infections to secondary bacterial invasion, as in measles and influenza.

Nothing could be more timely for men in the professions of medicine and of public health than a thorough review of the virus and rickettsial diseases, such as will be held under the auspices of the Harvard School of Public Health during the week of June 12 to 17. Within the past year New England has been confronted with a new experience in virus disease—the human cases of equine encephalitis—and with a rickettsial disease,—Rocky Mountain spotted fever,—familiar in the West but previously unknown in this region.

The problem of keeping abreast of the rapid developments in the epidemiology, the immunology and the treatment of this whole group of diseases is beyond the power of practicing physicians without the assistance of such opportunities for review as these meetings will provide. Undoubtedly to many the Symposium will be very welcome. Details as to the program and registration will be found elsewhere in this issue of the *Journal*.

## CITY HOSPITAL TROUBLE

THE editorial with the above title, which appeared in the May 4 issue of *The Boston Herald*,

so ably expresses appreciation of the services that Joseph P Manning and Dr George G Sears, as trustees of the Boston City Hospital, have rendered for many years to the people of Boston, so strongly calls the attention of Mayor Tobin to his responsibility in appointing new trustees who are equally well qualified, and so fairly condemns the City Council for its frequent, and usually uncalled-for, attacks on the hospital administration, that it is herewith reprinted in full

Mayor Tobin will be fortunate if he can find two men as well qualified as Joseph P Manning and Dr George G Sears to act as trustees of the Boston City Hospital. The former had served for more than a quarter of a century and Dr Sears for twenty-one years. They were as conscientious in their attention to the affairs of the institution as if they received a large salary, instead of no recompense at all, for attendance at the weekly sessions of the board. They had become thoroughly familiar, of course, with the problems of administration. In spite of political pressure, to which they were compelled to give way at times, they made no compromises which impaired the technical excellence of the hospital. Mr Manning brought to the discussions of the board the experience which he had gained as a highly successful man-of-affairs. Dr Sears contributed professional judgment of a high quality.

The periodic attacks on the City Hospital have made the lot of the trustees uncomfortable. Trivial defects which could be corrected at once if called quietly to the attention of the board have been ballyhooed out of all proportion to their importance by councilors who wished to gain a few votes. Criticisms based on misunderstanding have been frequent. The good sense and competence of the trustees have been questioned without justification. This irritating sniping, which has been going on so long, was perhaps one of the causes of the resignations.

No board of public trustees, paid or unpaid, can reasonably expect to remain immune from rigorous examination and some harsh criticism. It is the duty of the councilors, the finance commission, the mayor, the budget commissioner and others to exercise authority over such groups. It is quite wholesome that they should be required to give accounts of their stewardship. But, in the case of the City Hospital, the hostility at City Hall has gone to indefensible extremes. If it continues there will inevitably be deterioration in the quality of the trustees, and that will be reflected quickly by a deplorable decline in the efficiency of the hospital itself.

Members of the council can prevent a development of this kind by withholding their fire until they are sure they are correct, and then by refraining from making political capital out of a little mistake in hospital administration.

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### BLEEDING IN THE PUERPERIUM

Mrs T H, a gravida II, at term, entered the hospital December 8, 1930, in active labor.

The family history was nonessential. Her past history was negative except for attacks of tonsillitis. The patient's first pregnancy was normal and was terminated by mid-forceps. Catamenia began at twelve, were regular with a twenty-eight-day cycle and lasted four days. Her last period was March 3, making her due for delivery December 10. The present pregnancy had been normal throughout.

Examination after admission showed that the membranes had ruptured, the vertex was present in the OLA position. Labor was very rapid and in three hours the baby, weighing 8 lb., 11 oz., was delivered normally. Shortly after delivery bleeding began and the placenta was expressed. The patient was given ergot and posterior pituitary extract and the head of the delivery table was lowered, as her pulse was 160 and of poor quality. She was returned to her room in an hour, the pulse was 136 and of fair quality. An ice bag was applied to the fundus. One hour later, two hours after delivery, her condition was not good, and she became restless and irrational. The pulse was 110. The patient improved slowly but was very weak. She continued to flow bright red blood, and at 8 00 a m on December 21, thirteen days after delivery, she expelled a clot. At 10 a m the same day a large clot was expressed; the patient felt weak and her pulse was 120. Another clot was expressed at 10 20 p m, and she continued to expel small clots until the next morning when another large clot was expressed. At this time the patient's pulse was 160 and very weak.

Blood examination at this time showed a hemoglobin of 45 per cent, a red blood-cell count of 2,480,000 and a white-blood-cell count of 12,700. A consultant was called, and after her blood had been typed, she was transfused by the direct method with 600 cc of blood. At the conclusion of the transfusion her pulse had improved and the

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

blood pressure was 100 systolic, 80 diastolic. She was prepared for vaginal examination, and a piece of placenta the size of an orange was removed with the fingers. The uterus was washed out with normal saline, followed by alcohol, and packed tightly to the fundus. The pack was removed in twenty-four hours, and she was then given saline and alcohol intrauterine douches. The patient was discharged on the thirtieth postpartum day, with a hemoglobin of 75 per cent, a red-blood-cell count of 4,000,000 and a white-blood-cell count of 7000.

*Comment* Procrastination is often intelligent sometimes fatal. The evidence of the continued bleeding after the birth of this baby should have been recognized as abnormal and the uterus should have been explored much sooner than it was. Severe hemorrhage did not occur until thirteen days after delivery, but before that time there had been much more than a normal amount of flowing every day.

The treatment when the consultant was called is praiseworthy. No attempt was made to enter this uterus until after transfusion had been accomplished. The large piece of placenta was readily found and removed. This uterus was washed with normal saline and alcohol—a common performance in 1930 but one that is seldom employed today—and then packed. It is wise not to leave a pack in the uterus longer than twenty-four hours, and today most people would not follow the removal of the pack with an intrauterine douche. It is also barely possible that had posterior pituitary extract been used intravenously when the first bleeding occurred soon after the birth of the baby, this piece of placenta might have been extruded, however, relatively large pieces of retained placenta are usually somewhat adherent. The aftercare of patients that have bled freely should consist of an anemia diet, large doses of some preparation of ferrous sulfate, and fresh air and sunlight.

#### DEATHS

**AHLSTROM**—**HJALMAR AHLSTROM, M.D.**, died in February 1939. He was in his seventy-seventh year.

Dr. Ahlstrom received his degree from Tufts College Medical School in 1911. He was a member of the American Medical Association and the Massachusetts Medical Society.

**KELLOGG**—**FREDERIC L. KELLOGG, M.D.** of 350 Commonwealth Avenue, Boston, died May 2. He was in his seventy-third year.

Dr. Kellogg received his degree from the Bellevue Hospital Medical College, New York City, in 1889. He was

a member of the Massachusetts Medical Society and the American Medical Association.

## MISCELLANY

### NEW ENGLAND MEDICAL CENTER

On Wednesday afternoon, May 10, a reception was given by the Trustees of Tufts College at the Joseph H. Pratt Diagnostic Hospital of the New England Medical Center, as one of the activities of the recently inaugurated Tufts College Medical School Development Program. From two until four the guests were shown the activities of the New England Medical Center, under the guidance of students of Tufts College Medical School. These included visits to the various departments of the Joseph H. Pratt Diagnostic Hospital, the Boston Dispensary and the Boston Floating Hospital.

Tea was served in the library of the Diagnostic Hospital from three until four and was followed by series of short addresses in the auditorium. The speakers were Mr. Henry Parkman, Jr., chairman of the Tufts College Medical School Development Program; Governor Leverett Saltonstall, Mr. Leonard Carmichael, president of Tufts College, and Mr. Barry Smith, director of the Commonwealth Fund, New York City.

#### NOTE

The appointment, effective this fall, of Dr. Tracy J. Putnam as professor of neurology and neurosurgery at Columbia University College of Physicians and Surgeons and director of the services of neurology and neurosurgery at the Neurological Institute of the Columbia-Presbyterian Medical Center has been recently announced. Dr. Putnam is at present professor of neurology at Harvard Medical School and director of the Neurological Unit of the Boston City Hospital.

## CORRESPONDENCE

### EMERGENCY CALL FOR A WOMAN DOCTOR IN INDIA

*To the Editor* The Woman's Hospital at Gauhati, Assam, is in urgent need of a woman doctor. Located among the hill tribes in this province of northeastern India, this hospital has a unique opportunity. Until recently it had two American women doctors, but one has left to be married and the other has fallen ill. There are two American nurses on the staff, two Indian women physicians, eight Indian staff nurses and twenty-six nurses in the training school. The hospital has 45 beds and during 1938 cared for 700 inpatients. One hundred and forty operations were done during 1938, and the woman doctor now sought should be able to do surgical work. Laboratory and x-ray equipment is available.

This hospital is under the Woman's American Baptist Foreign Mission Society, which has carried on its work in India for the past century. Applications and inquiries should be addressed to the Christian Medical Council, 156 Fifth Avenue, New York City, or to Miss Hazel F. Shank, 152 Madison Avenue, New York City.

EDWARD F. HUMIE, M.D., *Director*  
Christian Medical Council  
for Overseas Work.

156 Fifth Avenue,  
New York City

## REPORTS OF MEETINGS

## WILLIAM HARVEY SOCIETY

At a meeting of the William Harvey Society of Tufts College Medical School on Friday, January 20, in the Beth Israel Hospital auditorium, Dean A. Warren Stearns introduced the speaker of the evening, Dr Stanley Cobb, whose subject was "Neurosis and Hysteria."

Dr Cobb introduced his subject by defining its importance and its limitations. General practitioners have stated that one third of their practice is concerned with acute infections, one third with chronic medical and surgical diseases and one third with what they term "functional disease," meaning thereby the neuroses. The word "neurosis" literally means "full of nerves," which obviously signifies nothing to us in this day and age. That the term means there is "nothing the matter" with the patient is untrue, a man with a neurotic symptom who asks for medical help is not to be sent away with a laugh just because physical examination and laboratory studies reveal nothing pathological. Perhaps, in the ultimate analysis, one may say that the neuroses belong in the field of neurology, by reason of the fact that they are outwardly expressed in terms of the neuromuscular system and inwardly in terms of the autonomic nervous system. The latter is often as expressive as the former, and it should be as much a part of the doctor's understanding. The sum total expression of the two systems is classed as "behaviour."

Dr Cobb's thesis for the evening was a systematic classification of the problems relative to the neuroses. The first or simplest form of neurosis he termed "exaggeration of the normal." This is a well known phenomenon to all and is a common experience in life. The palpitation, sweating, dryness of mouth, trembling, and so forth, of one who must stand before an audience is called normal. However, in some cases it may be manifestly extreme, such as in the neurotic individual who is seriously disturbed by frequent attacks of syncope. These exaggerations are often conditioned reflexes of special association, and a very common mode of expression is through the autonomic system, especially the gastrointestinal tract and the cardiorespiratory system.

The next type, in increasing degree of complexity, is the "anxiety neurosis," on which Dr Cobb has directed his special attention the past several years. The term should be applied only to one syndrome—to individuals who are anxious and have symptoms referable to the heart, lungs, chest and neck, taking the form of hyperventilation, rapid heart, a feeling of strangulation and not uncommonly a radiating heart pain indistinguishable from angina. These individuals, however, have perfectly normal hearts, lungs and thyroid glands.

The third form of neurosis is the "phobia," which is a symptom of anxiety but more specifically expressed and localized than the type described above. A special situation is required with specific associations.

Next comes "hysteria" as a special form. The term is often misused, the original meaning was "wandering uterus," in the sense that symptoms were variably referable to whatever organ or structure was the settling place of the wandering uterus at the moment. Dr Cobb believes hysteria should be reserved for a definite syndrome. He presented lantern slides abstracting ideas of several famous psychiatrists. Janet called it "retraction of the field of consciousness and dissociation," which is rather too abstract a definition for most of us to fathom. Babinski said it can be produced and relieved by suggestion, which Dr Cobb does not believe to be quite true. Adolph Meyer defines it as a condition occurring in individuals

who are somewhat limited and have something abnormal in their memory fields, and who develop medical or neurological symptoms as a result of their failure in dealing properly with an emotional problem at some early time. Such persons have an actual conversion of the anxiety into an overt symptom.

Dr Cobb presented a case report of a patient in this category. A nineteen year-old girl was first seen in a marked state of alkalosis, with hyperpnea and tetany. The maximum respiratory rate was 140 per minute, and the maximum pulse rate 140. At the time that these readings were noted, the pulse beats and respiratory movements were synchronous. She had a basal metabolic rate of +53 per cent, whereas under hypnosis, which relieved her condition, her normal was -11 per cent. The pH of her blood was 7.61, she ventilated 40 liters per minute, the normal mean ventilation being 5 to 7 liters. Dr Cobb suggested that it is useless to call this either organic or functional disease, it should rather be considered as being both, or a *ratio in equilibrio*.

The patient's history presented several possible early emotional experiences. She was underdeveloped, with respect to appearance, and had a small uterus. Such "baby doll" types are quite common among women, they know they are attractive and therefore their ideology is concerned with this fact. This is a characteristic of hysteria patients. All have an amnesia of the original cause of their present symptoms. It can be said that average men and women, if they had had similar emotional experiences earlier in life, might have developed similarly. Hysterical symptoms are called by Meyer "pseudoneurological," because they are expressions of either the neuromuscular or autonomic systems, or both. The hyperventilation described in this case was necessarily a mixture of both.

"Exaggeration of the normal," "anxiety neurosis" and "phobia" are forms of neuroses which can be grouped as coming under the autonomic or visceral sphere, and patients with such neuroses usually come to the medical wards. On the other hand, the next three classifications—"compulsion neurosis," "hypochondriasis" and "ruminate tension"—are more truly in the sphere of psychology. Lastly, "dementia praecox" and the "depression psychoses" are true psychoses. This classification illustrates gradations of increasing involvement, increasing divergence from the normal, and an increasingly unfavorable prognosis as one goes down the list.

Dr Cobb concluded his presentation with the statement that, as in all the sciences, there must be a first or descriptive period, so in psychiatry we are still collecting and describing, and perhaps just beginning to go on to the second period—to work on the problems of the underlying mechanism.

## HARVARD MEDICAL SOCIETY

At a meeting of the Harvard Medical Society on Tuesday, January 24, in the amphitheater of the Peter Bent Brigham Hospital, Drs. Merrill C. Sosman and Samuel A. Levine gave a presentation on the subject "Some Clinico-roentgenological Correlations, using case records and roentgenograms for illustration and confining their remarks to the heart, lungs and esophagus."

Dr Levine stated that the thesis for the evening was, "To make clearly understandable the limitations of both clinical and roentgenological methods." He said that in some cases the x-ray film is of no material assistance, whereas in other cases diagnosis and even the plan of treatment depend on it, and that the same holds true for physical examination.

The first case illustration concerned a fifty-eight-year-old man, who came in with a history of typical anginal distress, marked on effort, of several months duration. At discharge, his heart was clinically normal and in good condition, the x-ray findings confirmed this, the heart being normal in size. Two years later he returned with increased symptoms, and the x-ray findings included enlargement of the heart to the left and parallel areas of calcification in the coronary arteries. The patient underwent a total thyroidectomy, following which the heart showed a still further increase in diameter. The appearance was typical of myxedema, and after treatment with thyroid extract, the heart measurements decreased. The patient did very well for the next four years, then his attacks returned, and he died soon after. At autopsy, the calcified coronary artery walls were well demonstrated.

In this case the physical examination and x-ray examination were at first negative, the diagnosis depended on the history. Later, the x-ray films did show calcified coronaries. However, one may have calcification of the coronary arteries without angina pectoris, and vice versa. The x-ray, then, merely offered evidence incriminating the heart, and the case illustrated that angina must be diagnosed from the history and not from x-ray study. It was added that, in recent years at this hospital, thyroidectomy had not been performed because it was concluded that patients so treated became a great burden to themselves and later developed recurrences which were very difficult to treat.

The second case history was that of a sixty-three-year-old man, who complained of angina. He had pain and a choking sensation in his throat lasting from three to fifteen minutes and radiating down the sternum. However, effort and walking even in the coldest weather caused no pain. Physical examination revealed a heart slightly enlarged to percussion, an aorta large enough to be percussible (both of these findings Dr Levine had to admit meant little), a Grade I systolic murmur at the base, and a definitely visible pulsation at the base of the neck on the right. His blood pressure was 140 systolic, 80 diastolic. It was fairly certain the patient did not have angina pectoris, but what he did have was the problem.

X-ray examination revealed marked dilatation of the ascending, transverse and descending aorta. It was called "aneurysmal," but pulsations were absent. Dr Sosman stated that the absence of pulsations does not rule out aneurysm, but that their presence does not necessarily mean aneurysm. The x-ray film also disclosed enlargement of the heart, but in a backward direction such that it was inconceivable that it had been picked up by percussion.

The patient suddenly died five or six years later of rupture of the aneurysm into the pleura, he had never had "angina." Dr Levine stressed the facts that syphilitic aortitis does not produce pain except by occlusion of the coronaries or by erosion of the bones due to pressure from the aneurysm and that the aortic insufficiency in such patients does not give the pain of angina. Simple evidence for this is that in the South, where aortic insufficiency is so common, patients of this type do not have anginal symptoms. This case illustrates the great importance of x-ray study in the diagnosis of aneurysm of the aorta.

The third case was that of a sixty-six-year-old man, who, for six months, had had dyspnea on exertion, and later even at rest, and cough with the production of sputum. Physical examination revealed an enlarged heart, distant sounds, premature beats, a Grade II systolic murmur at the apex, a diastolic murmur, gallop rhythm, edema, an enlarged liver, and rales at both lung bases. The blood pressure was 145 systolic, 96 diastolic. The di-

agnosis was questionable syphilitic aortitis with aortic insufficiency. The x-ray films showed ventricular hypertrophy, and calcification in the aortic valve as seen in the oblique view. The latter, according to Dr Sosman, is usually a sign of rheumatic heart disease and has not been found in syphilis.

Dr Levine brought out the fact that in suspected syphilitic heart disease 80 per cent of the patients have a positive Wassermann test. Of the 20 per cent with negative tests, if the x-ray film shows calcification in the valve, then the lesion is of rheumatic etiology. This case illustrates the value of finding calcification of the aortic valve in ruling out the diagnosis of syphilis.

The fourth case was that of a nurse who came in for x-ray study of the chest more in jest than for any indication. The film showed the typical picture of rheumatic mitral disease with slight pulmonary congestion. Dr Levine had found a clear-cut, but faint, presystolic murmur, and obtained a meager history of chorea. The patient was symptom free for seven more years, then had dyspnea, and so forth, of a fulminating type. X-ray examination this time showed a much larger heart, and increased pulmonary congestion, which is often interpreted as rheumatic pneumonia. She died abruptly within a few months.

X-ray study having been the means of diagnosis in this case, Dr Sosman cannily asked Dr Levine if it were possible to have mitral stenosis without a murmur. Dr Levine countered by saying "Possibly, but almost never, whereupon Dr Sosman demonstrated roentgenograms showing a very large left auricle in a case in which Dr Levine had been unable to find a diastolic murmur. According to Parkinson, of London, x-ray examination revealing a large left auricle is the second most important sign of mitral stenosis. The inferences from these experiences were that auscultation of the heart is the most important method in the diagnosis of mitral stenosis, but that occasionally x-ray study is indispensable.

The fifth case was that of a fifty-three-year-old woman who had a history of palpitation and ascites of two years' duration. Her blood pressure was 160 systolic, 84 diastolic, her heart was slightly enlarged, with regular gallop rhythm, no murmurs, an electrocardiogram showing low voltage in the ventricular complexes, edema and a negative blood Wassermann test. A satisfactory diagnosis could not be made.

X-ray examination revealed marked cardiac enlargement and a dense shell of calcification all around the heart but more pronounced on the right, findings typical of constrictive pericarditis. Dr Sosman demonstrated kymograms of a similar case to show the improvement as measured by heart-border excursion after operation. In the present case, however, since the patient was comfortable and the progress of the disease very slow, it was thought that the risk of operation was not warranted. It was stated that some cases of calcification do not show constriction.

Dr Levine prefaced the discussion of congenital hearts by comparing congenital with acquired heart disease in general terms. The cyanosis of the former is the result of right-to-left shunting of the blood, whereas in the latter type it is due to poor aeration in the lungs as well as peripheral dilatation of the venules. In acquired heart disease, clubbed fingers occur only in subacute bacterial endocarditis, but are common in cyanosed patients with congenital heart disease. A loud murmur in a young patient is suggestive of the latter, and the electrocardiogram is of little use in diagnosis except in cases with dextrocardia and a few other rare anomalies. Polycythemia

is a common finding. Congenital hearts are subject to bacterial endocarditis, and have a high incidence of associated tuberculosis, mental deficiency and acquired rheumatic heart disease. Coarctation of the aorta and a patent ductus are relatively easy to diagnose, the tetralogy of Fallot and Rogers's disease and one or two other types are difficult but possible to diagnose.

Dr Sosman then presented several roentgenograms illustrating these conditions. A right arched aorta is demonstrated by the deviation of the esophagus, in adults, this may result in dysphagia lusoria. Coarctation could, at one time, be diagnosed only by the x ray findings of a small aortic knob, moderate cardiac enlargement, notching of the ribs and a large supra aortic saddle. It can be clinically suspected, now, where hypertension is found in youth. Dr Levine emphasized how slight the coarctation may be, and how very easily missed. He suggested that one routinely feel of the femoral arteries in cases of hypertension, especially in youth. In coarctation the femoral pulse is very weak or absent. The hazard for these patients lies in heart failure, rupture, bacterial endocarditis or cerebral accident.

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 11 30-11 55 Equine Encephalomyelitis in Man. Dr LeRoy D Fothergill.  
 11 55-12 25 Lymphocytic Choriomeningitis Dr Kenneth D Blackfan, Thomas Morgan Rotch Professor of Pediatrics  
 12 25-12 40 Louping Ill Dr LeRoy D Fothergill  
 12 40-1 00 Dengue Fever Lieut. Col. James S Simmons

## FRIDAY, JUNE 16

*Presiding*—Dr George C Shattuck, clinical professor of tropical medicine.

- 9 00-9 30 The Etiology of Yellow Fever and the Characteristics of the Infectious Agent. Dr A Watson Selkards, associate professor of comparative pathology and tropical medicine  
 9 30-10 00 The Epidemiology of Yellow Fever Dr Frederick F Russell.  
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 10 30-11 00 The Rickettsial Diseases A general survey Dr S Burt Wolbach, Shattuck Professor of Pathological Anatomy

## Recess

- 11 15-11 45 The Diagnosis and Classification of the Rickettsial Diseases Dr Henry Pinkerton, director, Department of Pathology, St. Louis University School of Medicine, formerly, assistant professor of pathology, Harvard University  
 11 45-12 15 The Clinical Features of Rickettsial Diseases Dr John E. Gordon.  
 12 15-1 00 Epidemiology and Immunity in the Rickettsial Diseases Dr Hans Zinsser

## SATURDAY, JUNE 17

*Presiding*—Dr C Sidney Burwell, dean and research professor of clinical medicine, Harvard Medical School

## PANEL DISCUSSION

- 9 00-10 00 Encephalitis Discussion directed by Dr Kenneth D Blackfan  
 10 00-11 00 Rickettsial Diseases Discussion directed by Dr S Burt Wolbach  
 11 00-12 00 Respiratory Diseases Discussion directed by Dr George K. Strode, associate director, International Health Division, Rockefeller Foundation, New York City

## AFTERNOON SESSIONS

## Harvard Medical School and Hospitals

- 2 15-3 15 and 3 30-4 30, daily Demonstration of Absorption from the Nasopharynx. Bldg C<sub>1</sub>, 2nd floor Dr Cecil K. Drinker, Dr Joseph M. Yoffey, research fellow in physiology, and Dr Madeleine F Warren, associate in physiology  
 Demonstration of the Pathologic Lesions of the Virus and Rickettsial Diseases Bldg D<sub>2</sub>, 2nd floor Dr

Henry Pinkerton, Dr Robert N Nye, instructor in bacteriology and immunology, and Dr G Kenneth Mallory, instructor in pathology

Exhibit of Insect Vectors of Virus and Rickettsial Diseases Bldg E<sub>2</sub>, 3d floor Dr Ernest E. Tyzzer, George Fabyan Professor of Comparative Pathology and Dr Joseph C Bequaert, assistant professor of entomology

Demonstration of Bartonella and Other Blood Parasites. Bldg E<sub>2</sub>, 3d floor Dr David Wenman, assistant in comparative pathology and tropical medicine.

Demonstration of Methods of Virus Culture. Bldg D<sub>2</sub>, 3d floor Dr John F Enders and Dr William M Hammon, instructor in epidemiology

3 30-4 30 Encephalitis Clinic. *Children's Hospital* Friday, June 16 If more apply than can be accommodated, there will be an additional clinic on Wednesday, June 14

Poliomyelitis Clinic. *Children's Hospital* Thursday, June 15 If more apply than can be accommodated, there will be an additional clinic on Tuesday, June 13.

Exanthemata Clinic. *Haynes Memorial Hospital* Monday, Tuesday, Wednesday and Thursday, June 12, 13, 14 and 15 Each clinic limited to forty persons Bus service will be provided. If more apply than can be accommodated, an extra clinic will be held on Friday, June 16

In order to avoid overcrowding and confusion, admission to demonstrations and to clinics will be by special ticket only Tickets will be distributed at the time of registration.

The Newton Health Department and the Whittier Street Health Unit, in which the Harvard School of Public Health is interested, will be open for inspection by any of the members of the Symposium who wish to visit them. Arrangement for visits may be made at the Registration Office.

## EVENINGS

## MONDAY, JUNE 12

- 8 30 Reception for Members of the Symposium and Their Families Courtyard and terrace of the Harvard Medical School.

## FRIDAY, JUNE 16

- 8 30 Pops Concert. Symphony Hall, Boston Tickets for the concert may be purchased at the Registration Office.

## ANNOUNCEMENT

AGNES A NERSESSIAN, M.D., announces the opening of an office at 153 Nahatan Street, Norwood.

## CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in Andrew Carney Assembly Hall on Monday, May 15, at 11 30 a. m. Dr J J Thornton will speak on "Hormone Therapy in Gynecology" Discussion by Drs James J McMan, E. L. Kickham and L. E. Phaneuf will follow

Mr S J Barham of the Associated Hospital Service Cor

poration is going to be present to discuss a very acute problem.

Physicians and medical students are cordially invited to attend.

R. J. HEFFERNAN, M.D., *Secretary*

## BOSTON DOCTORS SYMPHONY ORCHESTRA



Rehearsals of the newly organized Boston Doctors Symphony Orchestra, conducted by Nicolas Slonimsky, are held every Thursday evening at 7 30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

## BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Friday, May 19, in the auditorium of the Joseph H. Pratt Diagnostic Hospital, at 12 o'clock noon.

The program, under the auspices of the Department of Nerve and Mental Diseases, will begin at 12 30 p m. Dr Arthur Berk will speak on 'The Newer Methods for the Treatment of Dementia Praecox' and Dr Herbert I Harris will talk on 'A Diagnostic Problem Neurodermatomyositis'.

All those interested in the subject are cordially invited to attend.

ROBERT W. BUCK, M.D., *President*  
JAMES M. BATY, M.D., *Secretary*

## BOSTON LYING-IN HOSPITAL

The Journal Club will hold its next meeting at the Boston Lying-in Hospital on May 17 at 8 15 p m.

### PROGRAM

Diseases of the Veins. Dr Edward A. Edwards.  
Experience at the Boston Lying-in Hospital in the Care of Veins During Pregnancy and the Puerperium.  
Dr Weston Sewall.

Physicians and students are cordially invited to attend.

DUNCAN E. REID, M.D., *Secretary*

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, May 16, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 8 15 p m.

### PROGRAM

Presentation of cases.

The Turn of the Century—and After. Dr David Cheever.

Medical students and physicians are cordially invited to attend.

ROBERT M. ZOLLINGER, M.D., *Secretary*

## MASSACHUSETTS PSYCHIATRIC SOCIETY

The next meeting of the Massachusetts Psychiatric Society will be held at the Metropolitan State Hospital in Waltham, on Friday evening, May 26, at 8 30. Dr Emerick Friedman will speak on 'Alterations in Communicability, Content of Thought and Affective Response During Irritative Therapy'.

W. FRANKLIN WOOD, M.D., *Secretary*

## NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The spring meeting of the New England Obstetrical and Gynecological Society will be held at the Maine General Hospital on Wednesday, May 24.

Registration, ward rounds and operative clinics will be held from 8 00 to 12 00 noon. Luncheon will be served at the Maine General Hospital at 1 00 p m., and a meeting of the executive committee will be held at 1 30 p m.

A Dry Clinic at the Nurses Training School on Chadwick Street will take place at 2 00 p m. The program will be as follows:

Congenital Deformity. Dr Theodore M. Stevens.  
Some Interesting Phases of Postpartum Care. Dr Ralph L. Reynolds.  
Endometriosis of the Vagina. Dr Walter F. W. Hay.  
Metastatic Carcinoma of the Ovaries, Three Months Postpartum. Dr Carl E. Dunham.  
It Has Happened Here. Dr Adam P. Leighton.  
There will be a general meeting of the society and assembly at Lafayette Hotel at 5 00 p m. Dinner will be served at 6 00. The speaker of the evening will be Dr Martin Sorensen whose subject will be 'The Man from Iceland.'

## NEW ENGLAND PATHOLOGICAL SOCIETY

The annual meeting of the New England Pathological Society will be held at the Evans Memorial Hospital, 72 East Concord Street, Boston, on Thursday, May 18, at 8 00 p m. Dr Ernest W. Goodpasture, professor of pathology, Vanderbilt University School of Medicine, Nashville, Tennessee, will speak on 'Virus and Bacterial Infection in the Chick Embryo.'

Physicians and medical students are cordially invited to attend.

GRANVILLE A. BENNETT, M.D., *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MAY 15

#### MONDAY MAY 15

11 30 a m. Carney Hospital. Monthly clinical meeting and luncheon.

#### TUESDAY MAY 16

9 10 a m. Roentgenological Diagnosis and Differential Diagnosis of Bone Tumors. Dr Richard Schatzki. Joseph H. Pratt Diagnostic Hospital.

10 a m. 12 30 p m. Tumor Clinic. Boston Dispensary.

8 15 p m. Harvard Medical Society. Amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance).

#### WEDNESDAY MAY 17

9 10 a m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

\*12 m Clinicopathological conference Children's Hospital amphitheater

\*8 15 p m Boston Lying in Hospital Journal Club meeting

#### THURSDAY MAY 18

\*9 10 a m Recent Advances in Electrocardiography Dr H Magen dantz Joseph H Pratt Diagnostic Hospital

\*8 p m New England Pathological Society Evans Memorial Hospital 72 East Concord Street Boston

#### FRIDAY MAY 19

\*9 10 a m Some Clinical Aspects of Heart Disease Dr Reginald Fitz Joseph H Pratt Diagnostic Hospital

\*10 a m 12 36 p m Tumor clinic Boston Dispensary

12 m Urological conference, Massachusetts General Hospital lower outpatient amphitheater

\*12 m Boston Dispensary luncheon meeting of the Clinical Staff Auditorium of the Joseph H Pratt Diagnostic Hospital

#### SATURDAY MAY 20

9 10 a m Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital

\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

Open to the medical profession

MAY 12—National Hospital Day Page 768 issue of May 4  
MAY 12 and 13—American Heart Association Page 542 issue of March 23

MAY 13-16—American Board of Obstetrics and Gynecology Page 457 issue of March 9

MAY 14-20—American Physicians Art Association Page 404 issue of March 2

MAY 15—Carney Hospital monthly clinical meeting and luncheon Page 816

MAY 15-19—American Medical Association St Louis Missouri

MAY 16—Harvard Medical Society Page 817

MAY 17—Boston Lying in Hospital Journal Club meeting Page 817

MAY 18—New England Pathological Society Page 817

MAY 19—Boston Dispensary Luncheon meeting of the Clinical Staff Page 817

MAY 22 23 and 24—American Association for the Study of Gout Page 405 issue of March 2

MAY 24—New England Obstetrical and Gynecological Society Page 817

MAY 26—Massachusetts Psychiatric Society Page 817

MAY 26—Massachusetts Italian Medical Society Page 768 issue of May 4

JUNE 5 6 7 and 8—American Association of Industrial Physicians and Surgeons Page 581 issue of March 30

JUNE 6 7 and 8—Massachusetts Medical Society Worcester

JUNE 12-17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 815

JUNE 26-29—National Tuberculosis Association Page 936 issue of December 8

JUNE 29—Pentucket Association of Physicians 8.30 p m Hotel Bartlett 95 Main Street Haverhill

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22.

SEPTEMBER 11-15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3—New York Academy of Medicine. Page 581 issue of March 30

FALL, 1939—Temperature Symposium Page 218 issue of February 2

*The Physiology of Exercise A text-book for students of physical education* James H. McCurdy and Leonard A. Larson. Third edition, thoroughly revised. 349 pp Philadelphia Lea & Febiger, 1939 \$3.75

*Classified and Annotated Bibliography of Sir William Osler's Publications* Edited by Maude E. Abbott. Second edition, revised and indexed 163 pp Montreal The Medical Museum, McGill University, 1939 \$2.25

*End-Results in the Treatment of Gastric Cancer An analytical study and statistical survey of sixty years of surgical treatment* Edward M. Livingston and George T. Pack. 179 pp New York and London Paul B. Hoeber, Inc., 1939 \$3.00

## BOOK REVIEWS

*Diseases of the Nose Throat and Ear* W. Wallace Morrison 675 pp Philadelphia and London W. B. Saunders Co., 1938 \$5.50

This latest addition to the several new books on diseases of the ear, nose and throat fulfills in many ways the essential requirements of a good textbook. Adequate attention to anatomy and physiology is combined with clear description of pathological findings. The subjects of history taking and physical examination receive satisfying attention, and treatment is comprehensively covered within the limits of a book dealing with otolaryngology as a whole. Operative procedures are intentionally limited with a view of providing information rather more as to what surgery the patient requires than as to how it should be performed.

The text is illustrated with 350 line drawings all from the author's pen. The labor of such personal illustrating is patently colossal and merits greater success than has, in the reviewer's opinion, been achieved. An attempt to show, in a single drawing, too many individual items has resulted in a multiplicity of numbered designations which is confusing. Such a type of illustration necessitates elaborate legends, the searching of which induces fatigue and even discouragement. Admirable features are a special index of symptoms and a most comprehensive and useful formulary for the medical treatment of many common ailments.

There is a prefaced declaration that the book is intended primarily for undergraduate medical students and general practitioners, that such a book is provided, the reviewer cannot agree. The book on diseases of the ear, nose and throat ideally suited for these readers has yet to be written and cannot be modeled along the classical textbook lines which characterize such books as that of Dr. Morrison.

*Studies from the Rockefeller Institute for Medical Research* Vol 108 and 109 New York The Rockefeller Institute for Medical Research, 1938 \$2.00 each

Volume 108 of the reprints of the Rockefeller Institute for Medical Research contains further reports by Page and others on experimental hypertension. In addition a wide field in chemistry, physical chemistry, pathology, bacteriology, general physiology and animal and plant pathology is covered.

Among the articles of special clinical interest in Volume 109 are studies on aplastic anemia by Rhoads and his associates. Of particular interest, due to the cases of equine encephalitis encountered in New England this fall, is the article by Trager on multiplication of the virus of equine encephalomyelitis in the tissues of the mosquito.

## BOOKS RECEIVED FOR REVIEW

*The Student's Handbook of Surgical Operations* Frederick Treves Sixth edition, revised by Cecil P. G. Wakeley 563 pp New York Paul B. Hoeber, Inc., 1939 \$5.00

*Studies from the Rockefeller Institute for Medical Research* Volume 111 617 pp New York The Rockefeller Institute for Medical Research, 1939 \$2.00

*American Medicine Mobilizes* James Rorty 358 pp New York W. W. Norton & Co., Inc., 1939 \$3.00

*Alcoholics Anonymous The story of how more than one hundred men have recovered from alcoholism* 400 pp New York Works Publishing Co., 1939 \$3.50

*The Wisdom of the Body* Walter B. Cannon 333 pp New York W. W. Norton & Co., Inc., 1939 \$3.50

# The New England Journal of Medicine

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## STRANGULATED HERNIA\*

### A Report of Two Cases in Which the Sac Was Found In An Unusual Location

JOHN E. DUNPHY, M.D.†

BOSTON

WHEN the sac of a strangulated hernia is in an unusual location the difficulties in establishing the diagnosis and the subsequent mortality are greatly increased. Such is the case when strangulation develops in an interparietal hernia. In this condition the sac dissects between the layers of the abdominal wall instead of becoming subcutaneous. This type of hernia is probably more frequent than is generally realized. Many cases are overlooked or are mistaken for abdominal or retroperitoneal tumors. The following case reports are illustrative of the difficulties which may be encountered.

#### CASE REPORTS

*Case 1* A. B., a 57 year-old Jew, entered the Peter Bent Brigham Hospital complaining of abdominal pain, vomiting, distention and obstipation of 24 hours duration. Six years previously the patient had had a course of medical treatment for duodenal ulcer with complete relief of symptoms. Four years before the present admission he had had an attack of severe, cramp-like abdominal pain. The pain was situated in the lower abdomen slightly to the left, and was subsequently associated with nausea, vomiting and abdominal distention. The patient entered another hospital where an x-ray examination of the gastrointestinal tract by means of a barium meal and enema was reported to be negative. A diagnosis of chronic constipation and possible intestinal obstruction of unknown etiology was made. Operation was not thought necessary and the patient was discharged improved. Since that time he had had recurrent bouts of pain, all quite similar in character but less severe than the initial attack. The attack which brought the patient to this hospital was more severe than usual. The pain was accompanied by nausea, vomiting and abdominal distention. Always constipated, the patient felt that this symptom had been more severe in recent months. The last bowel movement was just prior to the onset of the attack.

Physical examination on admission showed a well developed, slightly obese man in moderate distress. The abdomen was moderately distended and tympanitic. In the left lower quadrant there was a tender mass about 10 cm

in length and 6 cm. in width. The external inguinal rings admitted the examining finger, but there was no tenderness, palpable mass or impulse on coughing. Digital examination of the rectum was negative. The temperature was 99°F by rectum, the pulse 90 and the blood pressure 130/80. The white-blood-cell count was 20,600, with 83 per cent polymorphonuclear leukocytes. The red-blood-cell count was 5,000,000, and the examination of the urine was negative.

The diagnosis on admission was intestinal obstruction due to neoplasm of the sigmoid. However, the surgical consultant suggested a diagnosis of a left inguinal hernia which had dissected laterally and upward toward the flank between the internal and external oblique muscles. Further confirmation of this impression was obtained by an x-ray examination which showed evidence of dilated loops of small intestine in a plain film and an apparently normal large bowel by means of a barium enema.

At operation an oblique incision similar to but higher and longer than that usually used for inguinal herniorrhaphy was made. On opening the fibers of the external oblique muscle a tense bluish mass, somewhat irregular in shape, was exposed. This was easily delivered, and proved to be a large hernial sac which had dissected upward and laterally from the internal abdominal ring between the internal and external oblique muscles. The sac contained a strangulated loop of small bowel and omentum. The latter showed extensive necrosis with much old scarring and chronic fat necrosis, indicative of previous attacks of strangulation. As the bowel was viable it was returned to the abdomen. The sac and omental tissue were excised and the neck of the sac closed by high ligation. The inguinal canal was repaired without transplantation of the spermatic cord. The post-operative course was uneventful. There has been no recurrence of symptoms to date, 1 year later.

*Case 2* C. M., a 40-year-old farmer, complained of a chronic pain in the right lower quadrant associated with the appearance of a mass in that area. Some years before, the patient had had an appendectomy with drainage but had never noticed any weakness or bulging in the wound, and the present palpable mass was lateral to the scar of the operation. When first seen, the patient was thought to have a retroperitoneal tumor. He was advised to enter the hospital for diagnostic procedures. This he refused to do. One month later he entered because of increasing pain and vomiting of 48 hours duration.

Physical examination on admission showed an obviously

From the Surgical Service of the Peter Bent Brigham Hospital, Boston.  
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ill man in severe pain. The abdomen was distended, tympanic and tender. There was an irregular puckered scar of an incision in the right lower quadrant with the scar of a drainage site about 5 cm. lateral to it. There was a mass 7 cm. lateral to the scar of the drainage site, well away from the incision. It extended from the groin upward and outward toward the right flank. At first it seemed to be retroperitoneal, but the physical examination suggested that the lesion might be more superficial. The clinical picture was obviously that of intestinal obstruction, but the mass could be correlated with this diagnosis only on the assumption that it was a ventral hernia arising from the drainage site and dissecting laterally between the layers of the abdominal wall.

At operation this was found to be the case. Between the internal and external oblique muscles, lateral to the old incision, there was a large hernial sac under acute tension. The neck of the sac could be traced to the site of the old drainage wound. The sac was found to contain a loop of gangrenous small bowel and omentum. Resection of the non viable segment of bowel with end to end anastomosis was performed. The convalescence, except for a slight infection in the wound, was not remarkable.

It is interesting that in both these cases the clinical picture was misleading. In one case it suggested a large-bowel lesion, and in the other a retroperitoneal tumor. In fact, these were the diagnoses of several observers. The correct diagnosis was arrived at largely by a proper interpretation of the physical examination, which in both cases suggested that the tumor was in the abdominal wall rather than retroperitoneal or intraperitoneal. A knowledge of the various types of interparietal hernia is a valuable aid in the correct appraisal of the physical examination.

Interparietal hernias are usually of the indirect inguinal type. However, direct or, as in one of the cases reported above, ventral hernias occasionally become interparietal. Interparietal hernias may be divided into three anatomical groups: properitoneal, interstitial and inguinoperitoneal.<sup>1</sup> In

the properitoneal type the sac lies between the peritoneum and the transversalis fascia, in the interstitial it lies between the muscles of the abdominal wall, and in the inguinoperitoneal it lies between the external oblique aponeurosis and the skin. This latter type is the commonest and is usually quite easily recognized. In the interstitial and properitoneal types the diagnosis is more difficult, and it is in these cases that the hernia is likely to be mistaken for an intra-abdominal or retroperitoneal tumor.

Properitoneal and interstitial hernias are often composed of two sacs which are hourglass in shape. One may occupy the usual position in the inguinal canal and the other extend laterally between the layers of the abdominal wall. There is always a common opening into the abdomen at the neck of the sac. The size of the external inguinal ring in these cases may be normal or unusually small.

#### SUMMARY

Two cases of strangulated hernia in which the sac was found in an unusual location (interparietal) are reported. In one of these the sac arose from the internal abdominal ring and passed between the internal and external oblique muscles in a lateral and upward direction. In the other the sac arose at the site of an appendectomy drain and extended laterally into the flank between the same muscles. Familiarity with the various types of interparietal hernia is a valuable aid in the diagnosis and leads to early surgical intervention and a favorable outcome of what otherwise is a highly fatal condition.

721 Huntington Avenue.

#### REFERENCE

1. Watson L. F. *Hernia: Anatomy, etiology, symptoms, diagnosis, differential diagnosis, prognosis, and the operative and injection treatment.* Second edition. 591 pp. St. Louis: The C. V. Mosby Co. 1933.

## THE FEMALE SEX HORMONES\*

ROBERT T. FRANK, M.D.†

NEW YORK CITY

THE sex cycles of women have been known from time immemorial—the twenty-eight day, menstrual, frustrated or infertile cycle and the two-hundred-and-eighty-day, reproductive or fertile cycle

Between 1900 and 1915 the anatomical basis of the cycles was studied intensively. Growth maturation of the ovum, ovulation and corpus luteum formation were synchronized with the changes which take place in the uterine mucous membrane. It was determined that during the ovarian follicular phase the mucosa proliferates and during the corpus luteum phase it secretes

In the succeeding decade, physiological experiments demonstrated that these changes were due to hormones elaborated by the follicle and corpus luteum. Shortly afterward, the primary stimulus of the ovary was discovered to be centered in the anterior pituitary gland. Since then successful efforts have resulted in the production of crude gonadotropic extracts—that is, testicular and ovarian stimulating factors—as well as isolation of pure, crystalline follicular (estradiol) and corpus luteum (progesterone) hormones.

It should be mentioned that the sex hormones, both male androgenic (testosterone), female estrogenic (estradiol), progestational (progesterone) and adrenocortical (adrenosterone), are very similar in structure, that they or some of their derivatives can be changed into each other by chemical means and that they all are closely related to cholesterol. Their generic chemical name is 'steroid' hormones. The importance of this relation is significantly emphasized by the fact that women as well as men excrete both male and female sex hormones. Disturbances in the balance of this normal chemical hermaphroditism may produce serious disturbances.

By means of biological reactions obtained in animals, and in some cases by chemical tests, the presence of these hormones in the blood, urine and tissues has been determined, both qualitatively and quantitatively. This has enabled investigators to demonstrate the underlying hormonal causes which produce the sex cycles (menstrual and reproductive).

In women no cyclical phenomena appear until

the onset of puberty. The menstrual, abortive cycle is initiated by the gonadotropic secretion of the prepituitary, which reaches its acme in the blood stream between the ninth and eleventh days. This hormonal flow stimulates ovarian follicular growth. The growing follicle, in turn, as does the corpus luteum, secretes estradiol, which stimulates the uterine mucosa to proliferate. When ovulation occurs (eleventh to fourteenth day) the corpus luteum secretes estradiol and progesterone. The latter causes secretion of the uterine mucosa, a change essential for successful embedding of the fertilized ovum.

If impregnation is not achieved, the corpus luteum regresses, the secretion of hormones by the ovaries ceases, and bleeding (menstruation) takes place through the degenerating mucosa. If pregnancy should ensue, the corpus luteum persists, and with it a high level of gonadotropic, estrogenic and progestational hormones continues in the blood throughout pregnancy. As a result, the many growth changes in the genital sphere which we associate with pregnancy develop and are maintained.

Hormonal studies performed on hundreds of women have given a welcome and enlightening insight into the hormonal conditions, both in normal states and in functional disease.

Today, however, a complete hormonal study of even one patient has become a formidable task. It entails weekly assay of gonadotropic and estrogenic factors of the blood, and daily assay (in three-day batches) of gonadotropic, estrogenic, corpus luteum and androgenic factors of the urine. The norms for fertile, menstruating women show some variation within well-defined limits. Additional data are obtainable by means of suction biopsies from the uterus and by vaginal smears.

Our investigations have shown that the pituitary-follicular-corpora luteum hormonal mechanism either functions normally or, if disturbed, overfunctions or underfunctions exactly as do other glands of internal secretion.

## OVERFUNCTION

Overfunction is evidenced by a greatly increased excretion of estrogens in the urine but no increase in the blood level, is observed in functional menorrhagia and metrorrhagia. Stationary hyperplasia of uterine mucosa and hyperplasia of the uterine muscle result.

Presented in part at the New England Postgraduate Assembly, Cambridge, Massachusetts, November 16, 1938.

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In contradiction to the numerous reported favorable results with gonadotropic factor (Follutein, Antuitrin S or anterior-pituitary-like hormone) I have seen no improvement from the use of these drugs. The results obtained with androgens, recently recommended, have likewise proved disappointing.

The treatment of menorrhagia and metrorrhagia must be varied according to the age group in which it occurs.

In adolescents from eleven to sixteen years old, and young women of sixteen to twenty years, if the basal metabolism is below -15 per cent (often -35 to -25 per cent), thyroid extract in adequate dosage is curative. If the thyroid function is normal, moccasin venom (1:3000) given subcutaneously in doses increasing from 0.2 to 2 cc thrice weekly controls the bleeding.

In mature women, non-endocrine causes of bleeding, such as fibroids, threatened or incomplete abortion, adnexal inflammation, ectopic gestation and cervical and corpus carcinoma, must first be excluded. Ergot, Cotarnine Phthalate and Antuitrin S may be tried but rarely prove effective. Resort should then be had to curettage, the curettings being subjected to microscopic examination. The curettage is of both diagnostic and therapeutic value. Endometrium in the secretory phase signifies that ovulation has occurred. If the curettage has been performed during the third week of the cycle and shows a proliferative phase only, this is interpreted by many clinicians as signifying that the bleeding is due to an anovulatory cycle.

If the patient has reached thirty-five years of age and has completed her childbearing, x-ray therapy may be given to the ovaries at any time within a period of six months following the curettage, should excessive bleeding recur. Preclimacteric bleeding, if severe, demands curettage, and may be followed at once by the intrauterine use of radium or subsequent x-rays to the ovaries.\*

Postmenopausal functional bleeding is due in most cases to a tumor (granulosa cell) of the ovary. Exploratory curettage to exclude carcinoma or polyp and subsequent oophorectomy are indicated. It should be kept in mind that occasional bleeding results from excessive doses of estrogen prescribed for the symptoms of the menopause.

In other words, as is true of the other glands of internal secretion, overfunction in the genital sphere necessitates surgical intervention in most cases.

#### UNDERFUNCTION

In this group I include amenorrhea, functional

sterility and dysmenorrhea. The primary site of the underfunction usually appears to lie in the prepituitary. Two constitutional abnormalities are frequent in this group, namely infantilism and eunuchoidism. The sex cycle is also unfavorably influenced by obesity, malnutrition and pulmonary tuberculosis.

**Amenorrhea** Primary amenorrhea signifies the non-occurrence of menstruation at the expected age (fourteen to seventeen years). Congenital malformations must be excluded. These patients are generally infantile or eunuchoid. Secondary amenorrhea is the cessation of menstruation after the menarche. I have observed the spontaneous return of menstruation after intervals of two to four or even seventeen years.

Bioassay has shown that amenorrheic women may have normal, acyclical or excessive blood and urine cycles. No satisfactory explanation of the non-occurrence of the uterine bleeding can be offered. The amenorrheic uterus does not respond by bleeding to a dose of estrogen which produces bleeding in the human castrate. From five to ten times this dose is required in amenorrhea.

If obesity, malnutrition or markedly reduced thyroid function is noted, dietary measures and thyroid therapy cure the condition. In all other cases my therapeutic efforts have failed. Neither gonadotropic factors or estrogens have helped. In my opinion the results credited to therapy are accidental and coincidental.

**Functional sterility** Many of this group are also amenorrheic. I have observed conception in amenorrheic patients. Others menstruate regularly and appear to possess normal genital organs. I have no data proving that anovulatory menstruation is more frequent in these patients than in normal women.

What has been said concerning the obese and hypothyroid in connection with amenorrhea applies likewise to the functionally sterile. Unless marked stigmas of infantilism or eunuchoidism are manifest, a prognosis is largely guesswork. My predictions have proved wrong so frequently that I no longer venture any. A single ovulation, at times followed by impregnation, has been induced by the intravenous injection of pregnant mare's serum, but I have not attempted this procedure.

**Dysmenorrhea** Menstrual pain is a symptom found in normal, infantile and overworked women. It is not invariably cured by childbirth. The underlying cause is unknown. In mild cases antispasmodics such as atropine (1/250 to 1/100 gr) combined with coal-tar drugs and codeine afford

\*Radiotherapy both with x-rays and with radium should be given solely by fully qualified specialists.



relief Emmenin (sodium pregnandiol glucuronide), an estrogen extracted from the placenta, taken over a period of months, may help. In the severest grades 1 mg of progesterone, the corpus-luteum hormone, injected subcutaneously two or three days before the expected period, and 5 mg with the onset of the pain, relieve but do not cure.

Morphine is contraindicated. I have never performed presacral sympathectomy for this trouble. In several persistent sufferers over thirty-five years of age I have induced the menopause by means of x-ray.

#### PREGNANCY

During pregnancy the hormonal conditions are abruptly elevated to high levels. In the blood the gonadotropic factor increases one thousand times, the estrogenic four times. Exact figures of the change in corpus-luteum hormone are lacking. From these findings it appears illusory to give either gonadotropic extracts or estrogens in pregnancy with any expectation of therapeutic effect. Progesterone may be prescribed in habitual abortion because it does calm uterine contractions and is essential for the embedding of the ovum. It is impossible to gauge the results obtained, particularly as we know that the placenta elaborates

gonadotropic, estrogenic and progestational factors throughout the duration of gestation.

#### MENOPAUSE

The menopause, if physiologic, is manifested by the gradual or abrupt cessation of menstruation. It may have been induced by x-rays or radium, as well as by operative castration. If the uterus alone is removed the blood cycle continues.

In the menopause, cardiovascular symptoms—flushes, sweats, palpitation and dizziness—most commonly develop. Their intensity varies in different individuals. Digestive and arthritic disturbances are frequent. Psychical and mental upsets may occur. Local genital atrophies are the rule. All these manifestations are relieved by adequate doses of estrogens given by hypodermic injection or by mouth. Some patients respond to 5000 international units given three times a week for two weeks. The treatment must be resumed when symptoms recur, if possible with progressively increasing pauses.

Objective guides of the effectiveness of the therapy are disappearance of excess gonadotropic factor in the urine and persistently positive (cornified cells) stained smears from the vagina.

1035 Park Avenue.

## THE PRESENT STATUS OF THE BLOOD SEDIMENTATION RATE

ALLEN S JOHNSON, M.D.\*

SPRINGFIELD, MASSACHUSETTS

**O**BSERVATIONS on the rate of settling of the red blood cells constitute one of the oldest laboratory procedures known to medicine. The writings of Galen in the second century A.D. suggest that the humoral pathologists of his time laid great stress on this phenomenon, albeit their interpretation was erroneous. As humoral pathology fell into disrepute these hematological observations went into the discard until the subject was revived in 1772, by Hewson,<sup>1</sup> who apparently distinguished between the stratification of drawn blood due to coagulation and that due to settling of the erythrocytes. Nasse<sup>2</sup> in 1836 made an exhaustive inquiry into sedimentation velocity and the aggregation of the red blood corpuscles, and the parallelism between the two was later pointed out by Jones<sup>3</sup> in 1843.

The first scientific investigation of this phenomenon began with the epochal studies of Fahraeus<sup>4</sup> in 1917, which resulted from his accidental observations on the increased sedimentation

velocity of the red cells in pregnancy. He recognized that this phenomenon was not specific for any particular disorder or physiological state, and his studies dealt chiefly with the physicochemical factors responsible. Stokes had already determined the velocity of movement of a spherical particle suspended in a fluid of lower specific gravity. Although this law of Stokes applies without modification only when the falling movement of the particle takes place in a fluid of infinite extension, it may be said for practical purposes that the rate of settling of the red cells is proportional to the difference between the specific gravity of the particle and that of the fluid, inversely proportional to the viscosity of the fluid and directly proportional to the square of the radius of the suspended particle. In blood sedimentation this radius is not the radius of the erythrocyte but of the red-cell aggregate, because of the phenomenon of clumping. Fahraeus showed that variations in the difference between the specific gravity of the blood and that of the suspended

\*Assistant Visiting Physician, Springfield Hospital.

particle and in the viscosity of the plasma had little influence on the sedimentation velocity. Of more importance was the red-cell concentration, and of vast consequence was the radius of the suspended particle. Hence the significance of the size of the red-cell aggregates. This size is determined by properties of the blood plasma and appears to be proportional to the serum globulin and serum fibrinogen. Some authors fail to agree with this dictum, such as Aldred-Brown and Munro,<sup>5</sup> who could find no correlation in 54 cases of rheumatic disease between sedimentation rate and fibrinogen percentage or globulin percentage of plasma proteins, and who concluded that the sedimentation rate had no connection with the globulin-albumin ratio, the fibrinogen-globulin ratio or the ratio of fibrinogen plus globulin to albumin and to total proteins. Gilligan and Ernestine,<sup>6</sup> however, demonstrated a close relation between the erythrocyte sedimentation rate and the fibrinogen content of the plasma and concluded that, except in certain cases with liver damage, the plasma fibrinogen plays the major role in controlling the corrected sedimentation index. This theory is likewise accepted by Cutler, Park and Herr,<sup>7</sup> Wintrobe<sup>8</sup> and many others.

The erythrocyte sedimentation rate may be measured by any one of three methods. The Linzenmeyer technic measures the time required for the upper level of the sedimenting cells to fall a given distance. Westergren measures the distance which they fall in a specified period of time. In Cutler's<sup>7</sup> method a graph is constructed from the distance which the sedimenting cells fall per unit of time during an hour. In this way it is possible to demonstrate three phases in the phenomenon of sedimentation: (1) aggregation of the red cells with rouleaux formation, during which little drop in red-cell level occurs and the graph is almost horizontal, (2) the sedimentation phase, during which the graph slopes with varying degrees of abruptness, (3) the packing phase, wherein the rate of sedimentation decreases with a consequent return of the graph toward the horizontal.

Greisheimer, Treloar and Ryan,<sup>9</sup> in a study of the interrelation of these methods, concluded that the average sedimentation in one hour for normal subjects was reasonably concordant for the three methods despite wide differences in tube width, anticoagulant concentration and length of fluid column.

Wintrobe<sup>10</sup> has pointed out certain sources of error in performing the test by whatever method. The rate may be delayed by an excess of anticoagulant. Because cell volume may be materially influenced by the type of anticoagulant used he recommends the combination of ammonium and

potassium oxalate devised by Heller and Paul,<sup>11</sup> in which the shrinking effect of the one salt offsets the swelling effect of the other. This appears to be as reliable as heparin and is certainly much cheaper. The bore and length of the tube must be kept within certain limits and the tube must be maintained in a vertical position if erroneous readings are to be avoided. Temperature likewise influences the rate of sedimentation, but the differences in temperature of the average laboratories will not cause significant error. More than four hours' delay in carrying out the test after withdrawal of the blood may likewise give rise to inaccuracies. For the actual technic of the test the reader is referred to any standard text on laboratory procedures or to the references.<sup>10, 11</sup>

The greatest controversy has raged over the importance of correction for anemia, as it is well recognized that red-cell sedimentation is more rapid in blood having a subnormal concentration of erythrocytes. This is more marked in the short tubes, but Cutler contends that the use of the graph which differentiates the three phases of the phenomenon makes misleading corrections for anemia unnecessary. Wintrobe thinks that such variations in cell volume may interpose significant error in the final reading, and has constructed a logarithmic curve<sup>10</sup> for correction of the sedimentation rate according to the cell volume obtained by high speed centrifugation at the completion of the test. He<sup>8</sup> admits, however, that a correction for anemia may occasionally obscure a pathologic sedimentation rate, and advises that both corrected and uncorrected rates be recorded. Unfortunately, he does not say which one is to be accepted. In spite of this ambiguity I have found the sedimentation test, performed and corrected according to Wintrobe, an exceedingly useful procedure provided its significance and clinical limitations be kept in mind. The uncorrected rate has hardly ever proved to be more accurate when compared with analogous tests and with the clinical picture as a whole. Most investigators agree that the increased length of the Westergren tube (200 mm) obviates the need of correction for anemia or cell volume, as packing here has much less influence on the rate than it does in a shorter tube. Bannick<sup>12</sup> and Bouton<sup>13</sup> have reached substantially these conclusions after particularly careful study. Perhaps the greatest argument in favor of the Wintrobe method is that the subsequent centrifuging makes possible a determination of mean corpuscular volume and icteric index and a rough macroscopic estimation of platelets and leukocytes with a minimum of effort.

The range of normal physiologic variations of any test must be known before it can be relied

on for the detection or measurement of pathologic states. There appears to be a slight difference between the two sexes in the upper limits of normal erythrocyte sedimentation. A correction for this is made only in the Wintrobe method, and recently Wintrobe has advocated abandoning the double standard as unessential. Riseman and Brown<sup>14</sup> found a slight elevation of the rate to be a normal concomitant of old age although Miller<sup>15</sup> considered this insignificant. During pregnancy the sedimentation rate increases from the tenth or twelfth week, and does not become normal until the third or fourth week post partum. The slight fluctuations occurring during menstruation are not important.<sup>8</sup> The taking of food or exercise seems not to influence the sedimentation rate. The most disturbing and apparently the least appreciated cause of variations is due to meteorological conditions. Hoverson and Petersen<sup>16</sup> have shown that just as meteorologic changes can cause variations in leukocytes, fibrin, platelets, corpuscular resistance, and so forth, so they may result in daily variations in the same person's sedimentation rate amounting to 100 per cent.

In spite of these drawbacks the sedimentation test has proved of great value in clinical medicine. Over eleven hundred references in the *Quarterly Cumulative Index* during the last ten years, on which this review is based, attest the general interest in its clinical application. Almost every conceivable clinical entity has been investigated with this procedure, and there is hardly a country not represented in the avalanche of literature which shows no sign of abating. One of the most comprehensive appraisals of its use was based on Cutler's<sup>17</sup> experience with 5000 patients over a six-year period. He emphasized, as had Fahraeus eleven years earlier, that the test was not specific for any particular disease. He pointed out that the mechanism was obscure and that the phenomenon depended on the amount of cellular destruction going on in the body. He listed the diseases giving an abnormal sedimentation rate as follows:

- Chronic infection, such as syphilis or tuberculosis
- Acute infection, such as pneumonia, septicemia or the exanthemas
- Malignancy
- Localized suppuration such as pyosalpinx or mastoiditis
- Acute intoxication such as lead or arsenic poisoning
- Endocrine disturbance, such as thyrotoxicosis

To these we may add, in the light of subsequent investigations

- Acute rheumatic fever
- Acute arthritis, whether rheumatoid, gonorrheal or tuberculous

- Syphilitic aortitis
- Myocardial infarction
- Pertussis (an abnormally low rate)
- Allergy (an abnormally low rate in certain types)
- Liver disease (an abnormally low rate with low plasma fibrinogen)
- Diabetes (r)

Simple catarrhal inflammation, such as uncomplicated appendicitis or a cold, and chronic ulcerations of small extent, such as peptic ulcer, have little influence on the sedimentation rate. The following diseases do not influence the sedimentation rate: functional disorders, as for example of the circulation or gastrointestinal tract, certain nervous disorders like dementia praecox, focal infections, metabolic diseases (diabetes<sup>2</sup>), allergy (in certain types), skin diseases, simple growths, such as nevi, lipomas and fibromas, simple cysts, and chronic valvular disease of the heart (in the absence of congestive failure).

Most of these conclusions were endorsed three years later by Lesser and Goldberger<sup>18</sup> in a study of three thousand tests on 2000 patients over a two-and-a-half-year period. They found that the normally high rate in pneumonia increased with the onset of complications such as pleurisy or empyema. The sedimentation rate in tuberculosis ran parallel to the activity and extent of the infection. It was elevated in pregnancy and greatly so in the case of a ruptured ectopic pregnancy. They concluded that its greatest value was in the differentiation of acute and chronic salpingitis, as a normal sedimentation rate was practically a guarantee of the absence of an acute pelvic infection. In simple catarrhal appendicitis uncomplicated by abscess or peritonitis the rate was normal in contrast to acute salpingitis, acute cholecystitis and the condition referred to as "the acute surgical abdomen." In rheumatic fever the sedimentation rate was proportional to the degree of activity of the infection. This has been confirmed by Massell and Jones,<sup>19</sup> who concluded that the sedimentation rate and leukocyte count were of about equal value as tests of low-grade rheumatic fever. They believed, however, that the sedimentation rate was the more valuable single test, though it might be increased by upper respiratory infections or tonsillectomy. One wonders if the elevation in these cases with respiratory infections may not have been due to reactivation of the rheumatic infection itself, inasmuch as Gallagher<sup>20</sup> found no elevation of the rate in moderately severe colds in the course of examining several hundred adolescents. Lintz,<sup>21</sup> moreover, encountered no elevation of the sedimentation rate in chronic sinusitis, chronic tonsillitis or periapical dental infections. He concluded that the reduction in sedimentation rate often observed in arthritics after the removal

of one or more of these foci was due to the subsidence of the arthritic process itself

Certain corrections and additions to Cutler's original list seem indicated in the light of subsequent studies. The elevated sedimentation rate in malignancy seems to depend on whether there is tissue destruction as, for example, from necrosis of the neoplasm. Reichel<sup>22</sup> found the rate increased in 90 per cent of cases with malignant tumors, but the evidence is not convincing that mere malignancy can give an elevated rate in the absence of tissue destruction.

Kramer<sup>23</sup> found the sedimentation rate elevated in 67 per cent of 366 diabetic patients. As the elevation could not be correlated with either the duration of the disease or the level of the blood sugar, he concluded that it was due to some focal infection, though this hardly appears warranted in view of the work of Lintz.<sup>21</sup>

Not only in rheumatic fever is the sedimentation rate increased but also in rheumatoid, tuberculous and gonorrheal arthritis.<sup>8</sup> In these conditions, likewise, it appears to be a valuable guide to the severity and progress of the disorder.

Danzer<sup>24</sup> has pointed out that the rate is elevated in syphilitic aortitis. This has been confirmed by Wood,<sup>25</sup> who found it elevated also in myocardial infarction but retarded in congestive heart failure. As aortic dilatation due to hypertension or arteriosclerosis is not attended by an elevated sedimentation rate, this test may prove of considerable value in establishing a syphilitic etiology in the face of the negative blood Wassermann test occasionally reported in cases of syphilitic aortitis. Riseman and Brown<sup>14</sup> have confirmed Wood's findings in myocardial infarction and has also observed an elevated sedimentation rate in many cases of angina pectoris. Although the figure in these cases is lower than it is in coronary thrombosis, one questions the reliability of the test in differentiating the two conditions. Certainly the writer has been repeatedly confronted with corrected sedimentation rates several times the upper limit of normal in patients whose clinical history, temperature and serial electrocardiograms only warranted a diagnosis of angina pectoris. This phenomenon may be due to minute areas of myocardial softening in the region of the coronary spasm which are too slight to produce the other clinical and laboratory evidence demanded for a diagnosis of myocardial infarction. In true myocardial infarction, however, an elevated sedimentation rate is so constant a finding, as these investigators, as well as Shookhoff, Douglas and Rabinowitz<sup>26-27</sup> have shown, that one must agree with Riseman that a persistently normal or only slightly increased sedimentation rate between the fourth and

the twelfth day after an attack of substernal pain is strong evidence against infarction.

Another use of the sedimentation rate not originally recognized by Cutler may lie in the diagnosis of whooping cough. Gold and Bell<sup>28</sup> believe that the triad of cough, leukocytosis with relative lymphocytosis and a normal or subnormal sedimentation rate is pathognomonic of pertussis, and have found a low rate in 94 per cent of the cases which have reached the stage of coughing.

Contrary to Cutler's original conclusions, allergy may affect the sedimentation rate. Schulhof<sup>29</sup> states that unless the rate is masked by infection it is abnormally slow in allergic patients and in their non-allergic close relatives. Another cause of a decreased rate is liver disease which results in a diminished plasma fibrinogen.<sup>8</sup>

Linton<sup>30</sup> believed at one time that the sedimentation was rapid in patients with obstructive jaundice who had a postoperative tendency to bleed, whereas it was normal or slow in those with no such hemorrhagic tendency. Clute and Veal's<sup>31</sup> studies have led them to question the reliability of this test, and Burke and Weir<sup>32</sup> state that the sedimentation rate is of no value in predicting postoperative hemorrhage in jaundice.

It is evident that we have learned little more of the fundamental mechanism of erythrocyte sedimentation since the epochal work of Fahraeus twenty years ago, in spite of literally thousands of papers on the subject. That it is not specific for any particular disease is well established. That the underlying mechanism is obscure is apparent. That it depends on, and is commensurate with, tissue destruction, however, is well agreed. The technical pitfalls are many, the intrinsic and extrinsic factors capable of distorting the sedimentation rate are insidious. Yet the very appreciation of its shortcomings and limitations makes this oldest of laboratory tests an extremely valuable tool to the clinician.

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## REPORT ON MEDICAL PROGRESS

### ELECTROLYTE AND WATER BALANCE\*

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THE clinician without access to a modern clinical laboratory need not necessarily feel that he is unable to take advantage of many of the chemical advances made in the treatment of disease. Although accurate chemical methods have of necessity been employed in the unraveling of certain clinical problems, the knowledge so acquired not infrequently enables the experienced physician to estimate metabolic disturbances by accurate clinical observations, and thus to reduce his dependence on information provided by the more elaborate laboratory procedures. On the other hand, there are many types of disease in which accuracy of diagnosis still depends to a large extent on chemical analyses.

It is the purpose of the present review to point out some of the frequently encountered disturbances in salt and water balances in which diagnosis and therapy are based on chemical analyses or reasoning.

The expositions of Gamble,<sup>1</sup> Peters<sup>2,3</sup> and Peters and Van Slyke<sup>4</sup> have clarified our understanding of the disturbances in salt and water balances associated with pathologic conditions that are frequently of concern to clinicians. It is now clear that edema and dehydration are more closely related to the masses of body fluids than to their

composition, whereas acidosis and alkalosis are dependent on the relative concentration of certain cations and anions of the body fluids. Since clinically significant dehydration and acidosis or alkalosis are often associated conditions, diagnosis and therapy require attention to the amount and composition both of the body fluids and of the repair solutions administered therapeutically.

A few years ago clinical analyses of the ionic composition of a patient's blood serum were often reported in such a variety of units that the physiological significance of abnormal concentrations was difficult to visualize. For example, in analyzing a patient's serum, total cations might have been reported as 140 cc. of N/10 base per 100 cc., chlorides as 320 mg per 100 cc., and carbon-dioxide content as 40 vol per cent. The correlation of values, expressed in such different units, to obtain a picture of the physiologic disturbance could not be made. Indeed, some laboratories might have reported the above serum-chloride analysis as 527 mg of sodium chloride per 100 cc., thus converting a perfectly good analysis into a misleading or meaningless result. Now, however, the expression of all plasma electrolyte concentrations in terms of milliequivalents per liter permits a ready comparison of changes which have occurred in different constituents. The normal values for the plasma electrolytes in this nomenclature are

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CATIONS		ANIONS	
	<i>m.eq</i>		<i>m.eq</i>
Sodium	138	Bicarbonate	26
Potassium	5	Chloride	104
Calcium	5	Proteinate	17
Magnesium	2	Sulfate	1
		Phosphate	2
Totals	150		150

As an illustration of the increase in information gained by employing these recognized clinical units, we may refer again to the serum of the patient cited above. Expressed as milliequivalents per liter the total cations=140, and of the anions, chloride=90 and bicarbonate=18. If the other anions normally present, that is proteinate, sulfate and phosphate, amount to their usual value of 20 milliequivalents, one has still only accounted for 128 of the 140 anion units which we know must be present for electrical neutrality. Clearly, then, the concentration of one or more of the anions normally present has increased or some abnormal anion is present in the plasma. Clinical observation, physiological reasoning and chemical analyses, singly or together, may be used to supply more specific information. But whether or not further analyses are made, the expression of such serum analyses in a single unit of concentration clarifies the clinical significance of the data. Gamble's<sup>5</sup> exposition of the chemical anatomy, physiology, and pathology of extracellular fluid clearly demonstrates the manner in which this unit of concentration permits a simple graphic representation of the chemical patterns of the blood plasma in pathologic conditions, which are otherwise difficult to visualize.

#### DEHYDRATION

No new single laboratory procedure has been introduced which indicates the presence and degree of dehydration better than the classical physical signs of dry tongue and mucous membranes, lack of skin turgor, sunken and soft eyeballs and, in the infant, depression of the fontanelle. Occasionally, however, dehydration associated with obesity or peripheral edema may be difficult to appraise without the aid of laboratory determinations. Those commonly used to obtain confirmatory or quantitative data are

- 1 Plasma volume<sup>6</sup> 7
- 2 Specific gravity of serum<sup>8</sup> 9 10 or concentration of serum proteins (refractometric,<sup>11</sup> Kjeldahl<sup>12</sup>)
- 3 Red blood-cell count
- 4 Hematocrit
- 5 Hemoglobin
- 6 Blood nonprotein nitrogen or urea nitrogen<sup>12</sup>

These procedures have both practical and theoretical limitations. Determination of the plasma

volume, if done accurately enough to be reliable, is too time-consuming for general clinical use. The same criticism applies to the determination of the extracellular fluid volume by the sodium thiocyanate method.<sup>13</sup> The last four procedures may provide evidence of dehydration, if values above the norms are obtained. But many of the patients for whom estimation of the degree of dehydration is desired suffer from other disturbances which affect the values obtained by these determinations. Starvation or Bright's disease may have lowered the serum proteins so that a normal serum specific gravity or protein concentration may be obtained in the presence of dehydration. Multiple myeloma, kala-azar or a liver tumor may give elevated values for serum specific gravity and protein concentration although dehydration is not present. A lipemia or azotemia may cause a high refractometric reading which is not the result of a high serum protein and dehydration. The red-blood-cell count, hemoglobin concentration and hematocrit reading are affected by anemia or polycythemia as well as by dehydration. The nonprotein nitrogen or urea nitrogen may be elevated because of renal insufficiency as well as by the oliguria of dehydration. Or the diabetic patient who is excreting a large volume of urine may be dehydrated without appreciable retention of nitrogen.<sup>14</sup>

Low serum sodium and chloride concentrations may be associated with the loss of fluids by vomiting, diarrhea and ileostomy or cecostomy drainage.<sup>15</sup> 16 They are also frequently observed in diabetic coma,<sup>14</sup> 17 18 severe chronic nephritis<sup>19-21</sup> and Addison's disease.<sup>24</sup> 25 Though they are related to the dehydration frequently present, they are not a measure of it. However, in such cases the determination of the serum concentrations of these substances may be very helpful in explaining symptoms and guiding therapy.

#### CONTROL OF HYDRATION THERAPY

More important clinically than the estimation of the degree of dehydration by laboratory determinations is the accurate control of parenteral hydration therapy by data obtained from chemical analyses.<sup>15</sup> 23 26 Since in dehydration the diminished blood volume and blood flow through the kidneys usually result in oliguria and poor renal function, plasma concentration changes are prone to occur prior to an improvement in renal function which is adequate enough to defend normal plasma concentrations. Because parenteral fluid is usually required when starvation has diminished the body nitrogen and when body fluid loss has reduced the body sodium and chloride, the administration of fluids which do

not provide sodium and chloride and plasma proteins or their nitrogenous precursors may result in a marked drop in the concentrations of these constituents of the plasma. Thus, the administration of glucose solution alone to the dehydrated patient may lower the plasma sodium and chloride concentrations to values of 115 and 60 milliequivalents per liter, respectively. Such changes so disturb the osmotic equilibrium between extracellular fluid and intracellular fluid that loss of electrolytes from the cells or passage of water into the cells produces a marked lowering in cellular concentrations.<sup>27-29</sup> The administration of isotonic sodium chloride solution may so lower the plasma protein concentration that edema results.<sup>23-30</sup> If pulmonary edema occurs, the effect of the therapy may be unfortunate. Or, as discussed below under the next heading, the administration of sodium chloride solution alone may produce an increase in the plasma chloride concentration and a decrease in plasma bicarbonate sufficient to produce or accentuate an acidosis. The administration of parenteral fluids may be accompanied by such a fall in plasma protein concentration that edema develops before the blood volume is restored, or by such a drop in red-cell count and hemoglobin that an anemia previously masked by the dehydration becomes apparent. In either case transfusion becomes an essential part of the hydration therapy.<sup>31</sup> Clearly, then, continuous parenteral therapy for periods of twenty-four hours or longer demands a knowledge of its effects on the concentrations of plasma proteins, sodium and chloride. With a properly equipped laboratory at hand, all three of these concentrations can be determined on a 1- to 2-cc sample of serum.<sup>10-12, 32-34</sup> Without a laboratory at hand to guide parenteral fluid therapy, the factors described above demand due consideration.

With dehydration and starvation there occurs with the loss of extracellular water and constituents a loss of intracellular substances. This loss is not replaced by present-day parenteral fluid therapy. Therefore an essential part of repair therapy is the oral administration of food as soon as this may be given without danger of a recurrence of any gastrointestinal disturbance that may have existed. It is as yet too early to discuss the administration of amino acids parenterally. Though nitrogen balances have been maintained by such therapy, severe reactions have been encountered.<sup>35-37</sup>

#### ACIDOSIS AND ALKALOSIS

##### Diagnosis

The types of alkalosis and acidosis most frequently encountered in clinical medicine are those designated as "metabolic acidosis and metabolic

alkalosis."<sup>38, 39</sup> These are the types in which hyperventilation and a low serum carbon-dioxide content accompany acidosis and in which hypopnea or Cheyne-Stokes respiration and a high serum carbon-dioxide content accompany alkalosis. Thus both the character of the respirations and a single chemical analysis indicate, in what might be termed the orthodox fashion, the nature of the disturbance. However, the diagnosis of acidosis and alkalosis cannot always be reduced to such simple indices as respiratory effort and serum carbon-dioxide content.\* The respiratory center may be depressed or may be stimulated abnormally, so that the type of respiration does not reflect the disturbances in acid-base equilibrium, and a decrease or increase in serum carbon-dioxide content no longer indicates respectively acidosis or alkalosis. The Henderson-Hasselbalch equation shows clearly the relation between the variables which the clinician must consider, if he is successfully to diagnose and treat the puzzling cases. The equation states,

$$\text{pH} = 6.10 + \log \frac{\text{HCO}_3}{\text{H}_2\text{CO}_3}$$

In normal serum,  $\text{pH}=7.4$ , the carbon dioxide from  $\text{HCO}_3=26$  millimols per liter, and the carbon dioxide from  $\text{H}_2\text{CO}_3=1.3$  millimols per liter. Keeping in mind that the concentration of  $\text{H}_2\text{CO}_3$  in the plasma is determined by the concentration of alveolar carbon dioxide and that this latter concentration is dependent on pulmonary ventilation, it is seen that the equation provides the clinician with the essential relation between pulmonary ventilation, bicarbonate content of the plasma and plasma pH. The pH is not dependent on the total carbon-dioxide content of the plasma, which can be measured readily, but on the ratio of  $\text{HCO}_3/\text{H}_2\text{CO}_3$ , of which neither the numerator nor the denominator is easily measured. This leads to the difficulties which bother the clinician.

Changes in the ratio,  $\text{HCO}_3/\text{H}_2\text{CO}_3$ , can usually be inferred from the total serum carbon-dioxide content, the history and type of respirations. When inference of this kind is possible, the determination of the serum carbon-dioxide content permits a satisfactory estimation of the three variables in the equation. However, the puzzling aspects of many cases cannot be resolved so simply. In such cases the colorimetric determination of the serum pH<sup>39</sup> in addition to the gasometric determination of total carbon-dioxide content of the serum, shows whether alkalosis or

\* For the ordinary clinical laboratory the determination of the carbon dioxide content seems preferable to the determination of the carbon dioxide combining power of the plasma.<sup>42</sup>

acidosis is present and, if desired, permits the estimation of the  $\text{HCO}_3$  and  $\text{H}_2\text{CO}_3$  concentrations. For, from the original equation, since  $\text{HCO}_3 = \text{total CO}_2 - \text{H}_2\text{CO}_3$ ,

$$\text{H}_2\text{CO}_3 = \frac{\text{total CO}_2}{1 + \text{antilog (pH} - 6.1)}$$

Shock and Hastings<sup>40</sup> have recently introduced a method of doing both determinations on 0.1 cc. of capillary blood.

From the Henderson-Hasselbalch equation it is clear that a low total carbon-dioxide content of serum, that is the carbon dioxide from both the  $\text{HCO}_3$  and the  $\text{H}_2\text{CO}_3$ , indicates a low pH and acidosis only if the ratio,  $\text{HCO}_3/\text{H}_2\text{CO}_3$  is less than normal. Such a lowering of both total carbon dioxide and the ratio occurs where the primary change is a reduction of the  $\text{HCO}_3$  either by loss of sodium or by accumulation of anions other than  $\text{HCO}_3$  in the blood or by both. This is by far the commonest type of acidosis and has been termed *metabolic acidosis*. It occurs in diabetic acidosis, the acidosis of severe renal insufficiency and the acidoses which accompany severe exercise, the ingestion of acids or acidifying salts and dehydration due to loss of gastrointestinal secretions and to the ensuing oliguria.

From the equation it is also clear that a low total carbon-dioxide content of serum may be associated with an increase in the  $\text{HCO}_3/\text{H}_2\text{CO}_3$  ratio above normal and therefore with an increase in pH and alkalosis. This situation occurs where the primary change is a decrease in alveolar carbon-dioxide pressure which causes a decrease in carbon dioxide dissolved in the plasma and a decreased carbonic acid ( $\text{H}_2\text{CO}_3$ ) concentration. This has been called the alkalosis of primary carbonic-acid deficit<sup>4</sup> or more simply, *respiratory alkalosis*<sup>38</sup>. It may be the result of the hyperpnea of encephalitis,<sup>41</sup> hysteria,<sup>42</sup> certain respiratory stimulants and oxygen lack.<sup>43</sup>

Again referring to the equation, a high serum carbon-dioxide content may be associated with an increase in the ratio and alkalosis. This has been called *metabolic alkalosis*, and may occur with the ingestion of alkaline salts, particularly in the presence of renal insufficiency<sup>44</sup> or with the loss of chloride in excess of sodium as frequently results in gastric vomiting.<sup>45</sup>

Or a high serum carbon-dioxide content may be associated with a decrease in the ratio and an acidosis. In this case the acidosis is one of primary carbon-dioxide excess<sup>4</sup> or a *respiratory acidosis*<sup>38</sup>. It may occur where there is suppression of the activity of the respiratory center because of toxins or exhaustion, paralysis of the respiratory muscles, upper respiratory obstruction or emphysema.

An accurate diagnosis of the type of alkalosis or acidosis is a prerequisite to the best therapy. The dependence of the clinician on laboratory analyses will vary with individual circumstances.

For example, in a case of diabetic coma, where the history is typical, the physical signs of dehydration, ketosis and hyperpnea are classical, and the glucosuria, ketonuria and hyperglycemia confirm the diagnosis, the chemical changes in the blood conform so closely to the pattern established by previous studies<sup>14, 17, 18, 46</sup> that the quantitative determination of the degree of acidosis contributes little diagnostically or therapeutically unless complications arise.

On the other hand, in a dehydrated patient with a history of diarrhea and vomiting, where the respiratory response may be depressed by toxemia and the urinary findings will be of almost no assistance,<sup>47</sup> the differential diagnosis of metabolic acidosis and metabolic alkalosis may depend on the determination of the carbon-dioxide content of the serum. Not infrequently a desirable understanding of the extent of specific concentration changes in the plasma occasioned by the loss of fluids is obtained only after determining the serum sodium and chloride concentrations as well.

In the treatment of a nephritic patient with acidosis it is important to know whether the lowered serum carbon-dioxide content is due to a diminished serum sodium or to an increase in the concentration of serum anions caused by the retention of metabolites. And the recognition of the recently described syndrome of chloride acidosis and nephrocalcinosis<sup>48, 49</sup> depends largely on the detection of a lowered serum carbon-dioxide and an elevated serum chloride concentration.

The diagnosis of respiratory alkalosis or acidosis usually depends on the determination of plasma pH and carbon-dioxide content. The determination of serum sodium and chloride concentrations may be helpful.

Finally, there are cases where combinations of conditions make appraisal of the situation extremely difficult. A case of methyl salicylate poisoning,<sup>50, 51</sup> for example, may be very puzzling. The vomiting tends to reduce the plasma chloride and to produce a high serum carbon-dioxide content and alkalosis. The salicylate, as a foreign organic anion, may tend to lower the serum carbon dioxide and produce an acidosis. The drug may stimulate the respiratory center, producing a hyperpnea with a low serum carbon dioxide and respiratory alkalosis. A correct appraisal of the situation, in order to ascertain whether sodium lactate or bicarbonate is indicated or definitely contraindicated by the hyperpnea, may require careful integration of the history and physical findings and several chemical determinations.



Shock and Hastings<sup>33</sup> have pointed out that the application of microtechnics in determining the acid-base equilibrium of the blood permits studying the paths of acid-base displacement and recovery after experimental displacement. Their use of triaxial co-ordinates is particularly appropriate for the graphic presentation of the three variables of the Henderson-Hasselbalch equation. Moreover, by plotting the logarithm of the percentage change in bicarbonate against time they obtained a linear relation in which the slope, "K," characterized the rate at which the blood returned from the experimental displacement to normal. Because the re-establishment of equilibrium depends largely on renal function their "constant of elimination" should prove useful in the evaluation of renal disease.

### Therapy

Clinically, *respiratory acidosis* is not in itself serious. In many cases the increase in plasma carbonic acid is beneficial because it stimulates respiration. Treatment, therefore, is directed not toward the acidosis but toward the cause underlying the respiratory disturbance.

*Respiratory alkalosis* only infrequently leads to symptoms of tetany which require treatment per se. If the tetany does demand immediate specific treatment, air containing an increased amount of carbon dioxide may be administered by having the patient rebreathe from a bag or from a closed oxygen tent with the soda lime removed from the system, or by supplying carbon dioxide directly to the inspired air. Morphine may also be helpful. The administration of calcium or ammonium chloride by mouth may increase the compensatory elevation of plasma chloride. Permanent relief, however, depends on treatment of the underlying disturbance. To mistake this type of alkalosis for acidosis and to administer an alkaline sodium salt may lead to serious tetany.

Adequate treatment of *metabolic alkalosis* resulting from an intake of alkaline sodium or potassium salts which exceeds the kidney's excretory ability is usually accomplished by discontinuing the alkaline salt and administering such amount of fluid as will provide a large volume of urine.

*Metabolic alkalosis* caused by the loss of gastric hydrochloric acid usually occurs in patients whose vomiting prevents the oral ingestion of food, fluid or medication. Dehydration and some degree of starvation therefore accompany the alkalosis and also demand treatment. Parenteral physiological saline solution is ideal for correcting the alkalosis and dehydration. It provides the three essential

substances, water, sodium and chloride, and in supplying the two latter in equal amounts\* tends to increase the plasma chloride concentration and to diminish the alkaline reserve<sup>34</sup>. The intravenous infusion of 10 per cent glucose solution stimulates the circulation, treats the starvation and provides fluid for an adequate volume of urine.

*Metabolic acidosis* due to sodium deficit sustained through loss of body fluid is usually accompanied by a gastrointestinal condition that prevents either the ingestion or absorption of substances taken orally. Dehydration and starvation are almost always present and demand treatment. The therapy must usually be provided by intravenous infusions and clyses or by continuous intravenous drip.

The dehydration and acidosis are treated by the parenteral administration of fluid containing chloride and sodium in concentrations appropriate to repair the plasma and extracellular fluid deficits and to correct the acidosis by providing for an increase in the diminished alkaline reserve. In the presence of the diminished renal function it is clear that physiological saline solution\* is not an appropriate solution for the initial parenteral therapy. In the dehydrated oliguric patient physiological saline solution tends to raise the serum chloride, lower the alkaline reserve and lower the pH of the blood<sup>15, 28</sup>. The introduction of sodium *r*-lactate for parenteral therapy by Hartmann and Senn<sup>53, 54</sup> provides a convenient, economical and appropriate parenteral solution. One part of M/6 sodium *r*-lactate solution to two parts of physiological saline solution makes a solution which contains approximately 150 milliequivalents of sodium and 100 milliequivalents of chloride per liter. The administration of this solution to the dehydrated acidotic patient provides the means of repairing the dehydration and restoring the alkaline reserve. If the acidosis is extreme, equal parts of the two solutions may be used in the initial stages of therapy. The total amount of solution to be administered is determined by the amount required to correct the dehydration. The rate of administration is based on the amount that can be given safely to each individual patient per unit of time. The therapy is controlled as already discussed under the section on the control of hydration therapy. The specification of a given number of cubic centimeters of M/6 sodium lactate solution and physiological saline solution per kilogram of body weight<sup>55</sup> seems too rigid and dogmatic to be recommended. The administration of

\*The concentrations of chloride and sodium in physiological saline solutions are each approximately 155 milliequivalents per liter. Hence the chloride concentration exceeds the normal plasma chloride concentration by 50 milliequivalents per liter.

that amount of sodium which by calculation<sup>54 55</sup> should bring the alkaline reserve, as measured by the serum carbon-dioxide content, back to normal seems theoretically of doubtful validity and practically an unphysiological procedure. There seems little justification to the use of solutions which substitute expensive Ringer's solutions for physiological saline solution. If calcium is needed, its specific administration in therapeutically effective amounts seems preferable to relying on the calcium supplied in Ringer's solution. There is no evidence to support the parenteral administration of potassium.

Except in cases of diabetic coma where intravenous glucose is not helpful and may be harmful,<sup>57</sup> the starvation is treated by 10 per cent glucose given intravenously. If the starvation is a prominent part of the picture, the basic caloric needs can be met by glucose supplied by a continuous intravenous drip without entailing hyperglycemia and glycosuria.

Metabolic acidosis due to retention of anions occurs as the result of renal insufficiency, faulty metabolism or the administration of salts which demand the differential excretion of so-called "fixed base." The last type of retention is usually corrected when the administration of the salt is discontinued. Diabetes mellitus and starvation both result in the retention of the ketone acids. The use of glucose in the treatment of the ketonemia of starvation has already been mentioned. The ketonemia in diabetes mellitus is treated by the administration of insulin while the dehydration and acidosis due to sodium deficit are being treated as outlined above. The retention of anions due to renal disease is frequently associated with diminished plasma sodium and chloride concentrations.<sup>19-23</sup> Treatment consists in providing a diet that demands a minimal excretion of the retained catabolic products, an adequate caloric intake, a liberal sodium and chloride intake (the former being somewhat in excess of the latter) and a large volume of urine.<sup>19 58 59</sup>

The recent work of Guest and Rapoport<sup>60 61</sup> on the role of diphosphoglyceric acid in the acid-base equilibrium of the blood cells has important therapeutic implications. Phosphate appears to be an essential factor in the restoration of the cells' normal chemical structure. If effective methods of providing phosphate can be found, the treatment of acidosis may be extended beyond the confines of the inactive plasma and extracellular fluids and into the regions of active cellular metabolism.

#### ADDISON'S DISEASE

Loeb<sup>24</sup> and Loeb, Atchley and Parson<sup>25</sup> have

called attention to and carefully analyzed the abnormal pattern of the blood serum in Addison's disease. The abnormalities commonly found are a decrease in serum sodium and glucose concentrations and an increase in the concentrations of serum potassium and nonprotein nitrogen.

The marked increase in the urinary excretion of sodium and chloride in Addisonian crises and the restoration of normal excretion by use of cortical extracts have been described by several groups of workers.<sup>62 64</sup>

The beneficial effects of the ingestion of sodium chloride in such amounts as will maintain normal plasma concentrations and salt balance have been demonstrated by Loeb and his co-workers,<sup>65 66</sup> Harrop, Soffer, Nicholson and Strauss<sup>67</sup> and others. The desirability of a restricted potassium intake as recommended by Wilder, Snell, Kepler, Rynearson, Adams and Kendall<sup>68</sup> has not been confirmed by general experience.

Loeb, Atchley, and Parson<sup>25</sup> concluded that a decrease in serum sodium concentration was the most sensitive chemical criterion of adrenal insufficiency in man. Harrop and his co-workers<sup>67</sup> have suggested the use of a salt-free diet as a diagnostic test. During the period of salt restriction, which is usually from three to five days, the patient is observed for symptoms of an Addisonian crisis, for a decrease in plasma sodium and chloride and for a high urinary chloride excretion. Because the test may provoke a serious crisis, they call attention to the necessity of the closest medical supervision. Zwemer and Truszkowski<sup>69</sup> suggested the diagnostic procedure of feeding 10 to 20 mg of potassium per pound of body weight and determining the concentration of potassium in the serum at frequent intervals. Wilder and co-workers<sup>68</sup> suggested the ingestion of potassium as a means of provoking an increased excretion of sodium and potassium.

However, chemical studies to determine serum concentrations and urinary excretions under the controlled conditions mentioned above provide confirmatory, not specific, evidence for the diagnosis of Addison's disease, and entail appreciable risk to the patient. The changes in the chemical composition of serum and the negative sodium and chloride balances which occur in Addison's disease are frequently observed in nephritis,<sup>10-13</sup> asthenia,<sup>70</sup> dehydration<sup>15 16 71</sup> and uncontrolled diabetes.<sup>14 17 18</sup> The ingestion of potassium salts by the nephritic patient may be associated not only with an increase in plasma potassium and urinary sodium excretion but also with serious untoward symptoms.<sup>72-75</sup>

More recently Cutler, Power, and Wilder<sup>77</sup> have described a simplified procedure for the diagnosis of Addison's disease. The test involves the administration of standard amounts of water and potassium and sodium chloride for two days and the determination of the concentration of sodium or chloride in the urine the morning of the third day. Because the analysis of chloride in urine is easier than that of sodium, chloride alone usually is determined. Urinary concentrations of chloride greater than 63 milliequivalents per liter are stated to indicate adrenocortical deficiency. The specificity of this test still needs verification by demonstrating its ability to distinguish Addisonian patients from those with the conditions mentioned above who tend to excrete large amounts of sodium and chloride in the urine, even in the presence of low sodium and chloride concentrations.

Moreover, the repeated observation of Addisonian crises with hemoconcentration and diminished plasma volume, without a decrease in the serum sodium concentration and without a loss of body sodium, chloride or water by way of the urine, suggests the important role that abnormal distribution of water and electrolytes may play in this disease.<sup>23 78-80</sup> Data are not yet available which are adequate to show that the determination of the total plasma sodium (as measured by the plasma volume and sodium concentration) is a more satisfactory criterion of Addison's disease than are serum concentration and urinary excretion values.

The recent work of Thorn, Engel and Eisenberg<sup>81</sup> with desoxy-corticosterone gives promise that this synthetic product will provide more economical and effective therapy than any now available.

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CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25201

## PRESENTATION OF CASE

A twenty-seven-year-old single male office worker was admitted complaining of loose bowel movements of one and a half years' duration.

Vague gas pains, coming on usually about 3 p.m. and relieved by changing position or massaging the abdomen, had been noted about one and a half years prior to admission. They were felt in the right upper quadrant over an area the size of the patient's hand. He then began to lose weight gradually in spite of a good appetite and an adequate diet. He gradually developed loose stools which contained mucus and, ten months before entry on two separate occasions, blood streaks. He had noticed none of these since that time. Six months before admission he was having four or five loose movements a day and occasionally one at night. These continued until two months before entry at which time they decreased to one or two movements a day though still associated with mucus. There was no significant pain. He had eaten fruits, vegetables and meat but avoided milk because it seemed to increase the mucus.

His past and family histories were noncontributory.

Physical examination showed a markedly undernourished man who appeared to be slightly anemic. Examination of the head and chest was negative. The blood pressure was 110 systolic, 70 diastolic. There was slight tenderness above and to the right of the umbilicus.

The temperature was 97.4°F, the pulse 120, and the respirations 20.

Examination of the urine was negative. The blood showed a red-cell count of 3,270,000 with 60 per cent hemoglobin, and a white-cell count of 12,400 with 85 per cent polymorphonuclears. The serum protein was 6.4 gm per 100 cc. A blood Hinton test was negative. The sedimentation rate was 18 mm in fifteen minutes, 40 mm in thirty minutes, 50 mm in forty-five minutes, 56 mm in sixty minutes. Numerous stool examinations were negative for blood and for parasites.

X-ray films of the chest were negative. The upper gastrointestinal tract was normal. The barium passed through the small bowel rapidly. The terminal ileum showed abnormal mucosa, appear-

ing nodular proximally and destroyed in the region of the ileocecal valve. There was no "string sign," the ileum being of normal caliber. The ileocecal valve was elongated and irregular. A barium enema showed that the colon was grossly abnormal. The ascending colon showed numerous rounded and irregular filling defects, in places these simulated polyps, while in other areas the defects were plateau-like and larger. A flat mass measuring up to 3 cm in diameter was seen just proximal to the hepatic flexure. The margins of the ascending colon showed fine, irregular projections simulating ulcerations. These apparent ulcerations were spotty in distribution, some of them being seen in the descending colon as far as the crest of the ileum, whereas parts of the transverse colon were fairly normal. The sigmoid and rectum were essentially normal.

On the third hospital day proctoscopy was done. The mucosa was granular and injected but not thickened or edematous. There were no ulcerations or hemorrhagic areas.

Transfusions, vitamins and a high caloric diet brought about little improvement. On the fifty-third hospital day an operation was performed.

## X-RAY INTERPRETATION

DR. AUBREY O. HAMPTON: This was an interesting case. I did the examination, and I was particularly impressed by the location of the changes in the colon and the size of the polypoid defects. Then there was a segment in the transverse colon which was fairly normal, and another area of smaller ulcerations at the splenic flexure and at the beginning of the descending colon which faded out toward the sigmoid. These polypoid-appearing lesions are quite definite and involve the whole ascending colon and hepatic flexure. In some films taken during fluoroscopy with pressure on the lesion there seemed to be one solid plateau or one elevation separate from the polyps. I think it is possible that pressure caused multiple polyps to blend into one another and to produce a defect similar to a flat mass. You can see there that the surface is granular. The colon is small in the proximal portion but of normal caliber from there on. The ileum shows an area of disease near the valve, but even there it is not constricted. The valve is elongated and irregular. The small bowel is normal. The chest was normal.

## DIFFERENTIAL DIAGNOSIS

DR. E. PARKER HAYDEN: This story is more suggestive of an inflammatory process than it is of malignant disease. The laboratory findings were essentially negative except for a slight leukocytosis and a somewhat rapid sedimentation rate.

which suggest infection. The stools were negative for blood, parasites and amebae.

The gastrointestinal x-ray findings are quite clear and yet it is difficult to make a definite diagnosis from them. The chest films were negative, while such a finding suggests that the intestinal condition was not due to tuberculosis, this is not necessarily so. The lack of a "string sign" in the ileum does not rule out regional ileitis because this is simply an indication of a very narrow ileum with marked spasm. Not all cases of regional ileitis exhibit this picture. The defects which appear in the x-ray resemble real polyps rather than the pseudopolyps which occur in ulcerative colitis and represent islands of ragged mucosa in the midst of areas of destruction. On the other hand, some cases of ulcerative colitis develop true adenomatous polyps.

We hear more and more about resections in regional ulcerative colitis which can occasionally be done when the lesions involve only the right colon. This patient was proctoscoped, and a note made that the mucosa was injected and granular but not thickened and edematous. I cannot accept this statement as correct because if the mucosa is granular I believe that it is always thickened. If the mucous membrane of the rectum were really granular, I should consider it diagnostic of mild ulcerative colitis. It is a question of the interpretation of that particular proctoscopy. I believe there is not much doubt that this patient had an ulcerative process which involved largely the right colon and the ileum. It has been thought that there may be a relation between ulcerative colitis and regional ileitis. One patient whom I had previously proctoscoped and on whom I had made a definite diagnosis of ulcerative colitis was operated on subsequently by another surgeon who resected two isolated areas of what he considered to be typical regional ileitis.

There is one other possible diagnosis to be considered—multiple polyposis. In this disease, although diarrhea accompanies it, we ordinarily do not see inflammatory changes of any extent in the mucosa. Furthermore, polyps are almost always present in the rectum. There were none in this case. Multiple polyposis is a familial disease and does not fit the picture in this case.

I believe the most likely diagnosis is an ulcerative inflammatory process of the right colon, of non-specific rather than tuberculous origin, with secondary polyposis.

DR CHESTER M. JONES. When this young man came into the hospital the story was very suggestive of a partially obstructive process in the region of the terminal ileum, and before we heard

the results of x-ray study, I wondered whether he did not have terminal ileitis or tuberculosis of the ileocecal region. Proctoscopy showed just about what was described in the protocol, but I should have added the note that the rectosigmoid looked more as if it were irritated secondarily from some process higher up than as if there were primary disease in that area. I think occasionally one gets a confusing picture of irritation and even partial superficial erosion which is not due to ulcerative colitis. The x-ray films certainly showed trouble in the region of the ileocecal valve but much more in the colon than I anticipated, and before operation it seemed to me that there was still a possibility of a tuberculous process. The obvious thing to my mind was that this boy was terribly undernourished. We decided that as soon as we got him in decent shape he would have to have an ileostomy and a resection of a large part of the bowel, how much, only to be determined at operation. If I remember correctly, when I went over the films with Dr. Hampton we agreed that there was involvement of the upper portion of the ascending segment of the colon but that there was also something in the region below the splenic flexure.

DR. ARTHUR W. ALLEN. Before operation I thought of all the possibilities that Dr. Hayden has mentioned, and we did put a good deal of stress on the splenic flexure. You may have forgotten it, Dr. Hampton, but we found areas in this region that were definitely diseased. At exploration it was very interesting that the transverse colon was as normal as any large bowel I have ever seen. His ascending colon was diseased and his descending colon was involved almost to the rectosigmoid junction. There was this definite skip of the transverse colon. So far as you could tell grossly the involved bowel could have been diseased by any one of the processes which Dr. Hayden has mentioned. Inasmuch as the rectum had appeared quite normal by proctoscopic examination and also seemed fairly normal to palpation, the ileum was transected and the proximal end anastomosed to the rectosigmoid. He did reasonably well aside from an ischiorectal abscess, but did not gain so much as we thought he might. After removing his right colon, at a second operation, he picked up fairly rapidly and gained as much as a pound a day, so that he was in a practically normal state of nutrition at the time of discharge. In view of the definite lesions in the descending colon it is difficult to explain why he has done so well, perhaps this is due to better drainage of this segment, or simply to less disease.



## CLINICAL DIAGNOSIS

Regional ileitis?  
Ulcerative colitis?

## DR. HAYDEN'S DIAGNOSIS

Non-specific ulcerative ileocolitis

## ANATOMICAL DIAGNOSES

Ulcerative colitis  
Adenomatous polyps?

## PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY The specimen showed all the usual features of a typical ulcerative colitis and, in addition, a marked polypoid hypertrophy of the remaining mucosa, in fact more marked than any we have ever seen. Some of the polyps were large enough, I think, to be considered adenomatous polyps. Between them there were characteristic areas of inflammatory thickening of the mucosa, of ulceration and of scarring of the muscular and serosal layers. There was nothing to suggest carcinoma.

DR. HAYDEN What was the flat mass 3 cm in diameter described in the x-ray—a cluster of polyps?

DR. MALLORY I should think that was it. We found nothing else that would explain it.

DR. ALLEN Do you want to say how many cases of ulcerative colitis of this degree you have seen without involvement of the rectum?

DR. MALLORY Very few if any.

DR. ALLEN How about you, Dr. McKittrick?

DR. LELAND S. MCKITTRICK I have never seen one.

DR. ALLEN Dr. Jones, is it new to you?

DR. JONES Yes.

DR. ALLEN And you, Dr. Urmey?

DR. THOMAS V. URMEY I have never seen it.

DR. ALLEN That is why I thought it must be something else and why I connected the recto-sigmoid with the terminal ileum. I have seen only one other patient that had had it done, and his rectum finally had to be removed.

DR. HAMPTON Certainly it is an unusual x-ray appearance. I do not believe you could get one out of a hundred to say that the lesion was due to ulcerative colitis.

told that he had a right kidney stone, the diagnosis having been established by x-ray examination. Six months before admission he first noted a small mass high in his right upper quadrant, beneath the costal margin. It was non-tender and caused no symptoms. Six weeks before entry he first noticed that his urine contained blood. He continued having hematuria intermittently with no urinary symptoms except occasional frequency. Three weeks later he noted that the mass was the size of an orange. It continued to grow until it occupied most of his right upper and lower quadrants. It was not tender, was movable and caused a dragging sensation while standing. His hematuria continued but was his only urinary complaint. He had been unable to eat anything but milk and eggs during the previous few weeks and had lost 20 pounds in weight during the two months before entry. He had had no other gastrointestinal symptoms, having had regular normal bowel movements and no evidence of blood in the stools. His past and family histories were non-contributory.

Physical examination showed a tall, nervous man weighing 200 pounds. Examination of the chest was negative. The blood pressure was 150 systolic, 95 diastolic. The abdomen contained a large soft mass the size of a football extending from the right upper quadrant down past the iliac crest. It was freely movable, non-tender and smooth, and descended with respiration.

The temperature was 99.5°F, the pulse 80, and the respirations 20.

The urine examination showed a specific gravity of 1.025, a trace of albumin, no casts, an occasional white blood cell and numerous red cells. Culture showed a moderate growth of *Staphylococcus aureus*. The blood showed a red-cell count of 5,000,000 with 100 per cent hemoglobin, and a white-cell count of 8000. The nonprotein nitrogen of the serum was 26 mg, the chloride 97 milliequivalents, the carbon-dioxide combining power 55.3 vol, the protein 6.4 gm and the sugar 97 mg per 100 cc. A blood Hinton test was negative. The serum calcium was 8.92 mg per 100 cc., the phosphorus 3.64 mg.

X-ray films of the chest and skull were negative. A flat abdominal film showed a large mass in the right abdomen extending from above the costal border to the crest of the ilium. No kidney shadow was visible outside of this mass. There was an ovoid area of calcification 2.5 by 1.5 cm overlying the right side of the sacrum. The right half of the pelvis, the right femur and the fourth lumbar vertebra showed evidence of extensive Paget's disease. An intravenous pyelogram showed prompt excretion of the dye on the left, filling a nor-

## CASE 25202

## PRESENTATION OF CASE

A fifty-six-year-old married Italian barber was admitted complaining of an abdominal mass of six months' duration.

Twenty-two years prior to entry the patient was

mal kidney pelvis and ureter. No excretion was visible on the right side after thirty minutes. After injection of the lower part of the right ureter through a catheter, the tip of the catheter lay just above the ureterovesicular orifice. The injected material passed upward to the area of calcification and showed the lower ureter to be grossly abnormal. Multiple irregular filling defects were demonstrated in the dilated ureter between the area of calcification and the ureterovesicular orifice.

On the fourth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. FLETCHER H. COLBY. The significant points in the patient's history are the diagnosis of right renal stone twenty-two years previously, the patient's observation of a tumor in the right upper quadrant six months before admission, and the fact that this tumor had increased rapidly in size during the past six weeks. Hematuria had been present for at least six weeks. The absence of severe pain is also a feature of the history. Physical and x-ray examinations seem to localize this mass to the right kidney, since no function could be demonstrated by intravenous pyelogram and no kidney outline was visible by x-ray. Hematuria in the majority of instances is due to tumor or tuberculosis. Other causes are inflammatory lesions, polycystic kidneys and certain systemic conditions such as purpura. I believe that the uncommoner causes of bleeding can be excluded by the normal laboratory findings and the x-ray examination. Tuberculosis does not merit serious consideration because of the noncontributory past and family histories and the absence of a marked degree of bladder irritability.

A renal stone was demonstrated by x-ray twenty-two years before, and the findings at entry were those of stone in the right ureter with hydronephrosis. The most reasonable explanation of the rapid growth of this tumor is the development of hydronephrosis. The diagnosis of stone and hydronephrosis would satisfactorily account for the symptoms and the findings in this patient with the exception of the x-ray appearance of the lower portion of the right ureter. These filling defects cannot be disregarded. They suggest papillary tumor, which is either primary in the ureter itself or possibly has grown down from the kidney pelvis and involved the ureter. A primary tumor of the ureter is a very unusual condition, but I do not see why it could not be present in this patient. I cannot go farther in the way of diagnosis without seeing the x-ray films.

In this film there is a large area of calcifica-

tion in the right ureter. I assume the bone changes are those of Paget's disease and not due to metastatic carcinoma, although I do not know how to tell the difference. My diagnosis is primary carcinoma of the ureter.

#### CLINICAL DISCUSSION

DR. GEORGE G. SMITH. I do not remember whether we suspected a ureteral carcinoma when we operated on this patient. I think we did not, because I operated on him, and as I remember it, I was somewhat surprised at the findings. I went in to do a nephrectomy and found a big hydronephrotic kidney which I took out. The ureter was dilated down to the pelvic brim. We passed a uterine sound down the ureter to find out where the stone was, and ran into an obstruction. I palpated the ureter and found a solid mass filling the ureter from a point just above the pelvic brim to one down over the brim. At that time I realized that we had a carcinoma of the ureter, so I tied the upper end of the ureter, closed the kidney wound, put the patient on his back and made a midline incision, stripping the peritoneum inward. I picked up the ureter, which was the size of my thumb, it was easily freed down to the bladder, as is so often the case with these tumors. Since it seemed to be normal for several centimeters above the point of entrance into the bladder, I did not make an elliptical incision including the entire right ureteral ridge but cut off the ureter just at the bladder wall and removed the lower portion of it.

This patient came in yesterday to the Tumor Clinic. He looks fine and feels perfectly well. I think he must have Paget's disease in the bones because he had no complaints. I asked him if he had bled, and he said that two weeks ago he had seen a few blood flecks in the urine. We cystoscoped him, and up in the dome of the bladder we found two small papillary tumors. I could feel no mass in the operative region. On bimanual rectal examination there seemed to be no thickening in the right side of the pelvis, but of course these cases of primary carcinoma of the ureter that get well are few.

#### CLINICAL DIAGNOSES

Right ureteral stone  
Hydronephrosis

#### DR. COLBY'S DIAGNOSES

Primary carcinoma of the ureter  
Hydronephrosis  
Ureteral calculus

## ANATOMICAL DIAGNOSES

Primary papillary carcinoma of the ureter  
Ureterolithiasis  
Hydronephrosis

## PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The lumen of the ureter was greatly dilated around a stone, and the stone itself was completely embedded in shaggy papillary masses of neoplastic epithelium. There was no gross or microscopic invasion of the wall that we could make out. The kidney lesion was a simple hydronephrosis, and there was no evidence of papillary tumor in the pelvis, so that there is no doubt in this case that the tumor was primary in the ureter. The later appearance of papillomas in the bladder, way up in the dome and nowhere near the mouth of the ureter, suggests, as do so many of these cases, that one is dealing with an underlying disease of the transitional epithelium that lines the entire urinary tract. This is evidenced by a tendency to the formation

of papillary neoplasms throughout the tract, and in many cases the reappearance of tumor has to be looked on as a new primary tumor and not metastasis. In this case I should think that that was almost certainly true.

How would you feel about that, Dr Smith?

DR SMITH The point against that is the fact that there are no papillomas in the other kidney and yet they are present in the bladder. I agree with you that it does seem as if there were some predisposing condition of the bladder mucosa that makes these tumors develop. That is a line of argument I have used regarding many bladder carcinomas, but I do not know that it applies in this case. I could not believe that it was due to a bit of tumor being borne down the ureter and being implanted, but that is possibly the case.

DR MALLORY Primary carcinoma of the kidney pelvis or ureter is an extremely rare disease, and on a statistical basis, one would not expect many patients to have it in both kidneys.

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## ANNUAL MEETING

THIS issue of the *Journal* presents the complete program of the one hundred and fifty-eighth annual meeting of the Massachusetts Medical Society, to be held in Worcester at the Municipal Memorial Auditorium, Tuesday, Wednesday and Thursday, June 6, 7 and 8. The Auditorium is ideally suited for the meeting. Surrounded by adequate parking facilities, it has one large hall to house the scientific and commercial exhibits, a theater in which to hold the consecutively run section meetings, rooms for discussion groups and committee meetings, and space available for a cafeteria where lunches will be served,—all the daytime program will be carried out under one roof. The evenings' events, the Shattuck Lecture

and the annual dinner, will be held at the Hotel Bancroft.

The changed form of this year's program for the section meetings should receive the attention of the fellows of the society, and it is hoped, their approval. All the section meetings are to be held in the Little Theater of the Auditorium. Unlike former years, these meetings are to be consecutive general assemblies with no two sections holding simultaneous meetings. Not only does such an arrangement promise a large attendance at the individual section meetings, but the fellows will be enabled to attend any or all the meetings without the necessity of missing one of two topics in which they are interested, an inevitable occurrence while more than one of the sections were meeting simultaneously as under the form of program previously followed.

In 1937 a day devoted to a combined clinical meeting was introduced to our program. Its success both then and last year was definite. This year a somewhat different plan has been developed by the Worcester committee for Wednesday, June 7. The morning is to be taken up by a combined meeting at which Dr. Richard B. Cattell, of Boston, Dr. Arthur M. Fishberg, of New York City, Dr. Walter C. Alvarez, of Rochester, Minnesota, and Dr. Emil Novak, of Baltimore, will present subjects of interest and importance to physicians regardless of whether they are engaged in the practice of general medicine or of the specialties. Wednesday afternoon is to be devoted to round table discussions. Three of these will be run simultaneously with a change of subject every hour. The nine subjects to be discussed are "Cranio-cerebral Injuries," "Heart Disease," "Hyperthyroidism," "Pneumonia," "Low-Back Pain," "Peripheral Vascular Disease," "Urinary Infections," "Neonatal Injuries" and "Adolescent Prepsychotic Conditions."

The entire program of this year's annual meeting has been worked out thoughtfully with one chief objective to present to the fellows of the Society through the medium of speakers of wide experience in their respective fields more or less specialized subject matter of general importance.

## SPEAKING OF BATH TUBS

A TREATISE could be written on the impact of plumbing on American life and morals, to say nothing of our art and letters. Not too many years ago this influence was practically nil, the lead pipe and the tin tub were viewed askance by the virile majority of our ancestry, at a time when the flush toilet was considered in many quarters as little short of immoral.

As wealth accumulated and men decayed, an easier attitude was adopted toward hot and cold running water, it was conceded that cleanliness could still be a virtue, even if not attained under the barnyard pump with a bar of laundry soap and a curry comb. The plumber was accepted as a member of society and admitted to many churches in good standing, although, as a class, the knights of the Sullson wrench were still held up as models of clumsiness. As late as 1920 the likening of a surgeon to a plumber constituted fighting words, and even members of the new genitourinary specialty were inclined to be annoyed. Since the panic of 1929, anyone who can charge for his time while going back to the office after a forgotten blow torch is held in high esteem, and many an erstwhile banker has surreptitiously learned how to change a faucet washer and sweat a mean joint.

The bath tub is, of course, no innovation. Many Pompeians and Herculaneans were caught at the bath when proud Vesuvius erupted, and Gibbon practically attributed the decline and fall of the Roman empire to the prevailing use of the hot bath at that period of history. Warm baths are so relaxing!

Are we to meet a like fate? It is the thought that tortures us when we read in *The Commentator* that since 1900 more than 16,250,000 bath tubs have been manufactured and sold in this country. If cleanliness has come that close to godliness since the turn of the century, then woe betide us!

We recall (editorially speaking) a circular tin affair, about six inches in depth, that our paternal ancestor once had built for his personal use, plagiarizing on an English model. It was filled, pail after pail, by a perspiring servant, and was a far cry from the untid pleasures of the twittering twenties, but still, the menace was there.

There are no two ways about it. Plumbism has its insidious dangers. We (editorially speaking) are reminded of a family that kept a tame otter by the name of Josephine. Apparently otters are readily tamed, except for certain atavistic tendencies. Uninitiated guests, on asking for the privilege of washing (sic) before dinner, would be confused and a little bewildered by finding on the bathroom door a neatly lettered placard "Please keep the door shut, as Josephine likes to sleep in the toilet."

## MASSACHUSETTS MEDICAL SOCIETY

## LEGISLATIVE NOTES

*House Bill 2151* This bill to license chiropractors was reported by the Committee on Public Health. No legislation necessary. However, there were seven dissenters. Actually it was a tie vote, as Senator Olander, of Northampton, did not vote, being absent because of sickness. The names of the dissenters were Senators Montminy, of Lowell, and Skibinski, of Chicopee, and Representatives Besette, of New Bedford, Brooks, of Lawrence, Jordan, of Revere, Lunney, of Holyoke, and Stetson, of Middleboro. The legislators who voted against the chiropractors were Senator McCooley, of Worcester, and Representatives Bergeron, of Amherst, Cutler, of Needham, Kaplan, of Boston, Kelley, of Worcester, Vaughan, of Belmont, and Whitcomb, of West Boylston.

It may be seen from this list that the Worcester District Medical Society has done the most effective legislative work in connection with this bill.

On May 16, at the third reading of the bill in the House, the committee's report of no legislation necessary was accepted, and since this report was unfavorable, the bill has been referred to the Senate for concurrence.

CHARLES C. LUND, *Chairman*

## DEATH

CABOT—RICHARD C. CABOT, M.D., of 101 Brattle Street, Cambridge, died May 8. He was in his seventy-second year.

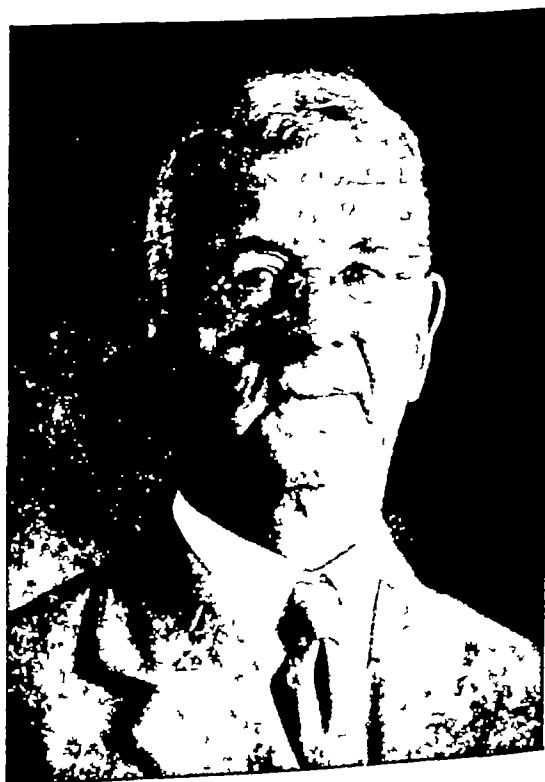
He received his degree from the Harvard Medical School in 1892. Dr. Cabot was made an assistant professor in medicine at Harvard Medical School in 1899 and in 1918 was raised to a full professor of clinical medicine. Two years later he was appointed professor of social ethics at Harvard University and held that position until his retirement in 1934.

Dr. Cabot was affiliated with the Massachusetts General Hospital and was a member of the consulting staff at the time of his death. He was also a consultant at the New England Hospital for Women and Children, the Westboro School for Boys and the Lancaster School for Girls. In 1905 he inaugurated a social service department at the Massachusetts General Hospital; the value of this type of work was soon appreciated and such departments were subsequently established in the majority of the large hospitals of the country.

Among his affiliations were fellowships in the Massachusetts Medical Society, the American Medical Association and membership in the Association of American Physicians.

Two brothers, Dr. Hugh Cabot and Philip Cabot, survive him.

## OFFICERS OF THE MASSACHUSETTS MEDICAL SOCIETY, 1938-1939

DR. CHANNING FROTHINGHAM, *President*DR. A. WARREN STEARNS, *Vice President*DR. ALEXANDER S. BEGG, *Secretary*DR. CHARLES S. BUTLER, *Treasurer*

# MASSACHUSETTS MEDICAL SOCIETY

## THE ONE HUNDRED AND FIFTY-EIGHTH ANNIVERSARY

Tuesday, Wednesday and Thursday, June 6, 7 and 8

Municipal Memorial Auditorium and Hotel Bancroft, Worcester

The exercises of the one hundred and fifty-eighth anniversary of the Society will be held in Worcester, on June 6, 7 and 8, at the Municipal Memorial Auditorium and the Hotel Bancroft. Members of the medical profession are cordially invited to attend.

The general arrangements for the meeting have been made by the Committee of Arrangements, consisting of Drs. Richard P. Stetson, chairman, Augustus Thorndike, Jr., Edward J. O'Brien, William T. O'Halloran and James A. Halsted. The local arrangements have been in charge of committees from the Worcester District Medical Society, with Dr. Charles A. Sparrow acting as general chairman and Dr. James C. McCann, as assistant chairman. The chairmen of the various local subcommittees are as follows:

COMBINED GENERAL MEETING AND ROUND TABLE DISCUSSIONS Dr. James C. McCann.

SCIENTIFIC EXHIBITS Dr. William J. Elliott.

PUBLICITY Dr. Philip H. Cook.

TRAFFIC AND PARKING Dr. Robert J. Northbridge.

SECTION MEETINGS AND AIDS Dr. George R. Dunlop.

GOLF Dr. Julius J. Tegelberg.

REFRESHMENTS Dr. Henry L. Kirkendall.

ENTERTAINMENT Dr. George C. Tully.

LADIES COMMITTEE Mrs. Charles A. Sparrow.

The registration desk will be on the stage of the Worcester Municipal Memorial Auditorium.

All section and combined meetings, as well as that of the Council, the annual meeting, commercial and scientific exhibits, and luncheons will be held in the Municipal Memorial Auditorium.

The Shattuck Lecture and the annual dinner will be held at the Hotel Bancroft.

The scientific and commercial exhibits will all be located in the main hall of the Auditorium.

A special telephone switchboard and operator will be installed in the Auditorium for the use of the fellows. The telephone number will be WORCESTER 3-1401. Please use this number.

A cafeteria will be maintained in the Auditorium for the use of those attending these meetings.

A golf tournament will be held at the Wachusett Golf Club on June 6 and 7.

Moving pictures of medical subjects will be shown throughout the meeting.

Windshield suckers will be sent to all fellows and cars bearing this sucker will be shown special parking consideration by the Police Department of the City of Worcester.

### TUESDAY, JUNE 6

#### SECTION OF MEDICINE

9 45 to 11 15 o'clock

Little Theater, Worcester Memorial Auditorium

Dr. Edward P. Baggs, Holyoke, *Chairman*

Dr. Erwin C. Miller, Worcester, *Secretary*

1 *The Importance of Hypochromic Anemia* Dr. William P. Murphy, Boston

2 *The Role of Oxygen in the Treatment of Pneumonia* Dr. Alexander M. Burgess, Providence, Rhode Island (by invitation)

3 *Atypical Pneumonia of Unknown or Possibly Virus Etiology* Dr. Michael E. Murray, Jr., Cambridge and Boston.

Committeeman in-charge Dr. William T. O'Halloran, aids, Drs. Roger W. Robinson and George C. Erickson.

#### SECTION OF DERMATOLOGY AND SYPHILOLOGY

11 30 to 1 00 o'clock

Little Theater, Worcester Memorial Auditorium

Dr. E. Lawrence Oliver, Boston, *Chairman*

Dr. John G. Downing, Boston, *Secretary*

1 *Chairman's Address* Dr. E. Lawrence Oliver, Boston.

2 *Latency and Wassermann Fastness* Dr. Paul A. O'Leary, Mayo Clinic, Rochester, Minnesota (by invitation)

3 *The Indications and Contraindications of Roentgen Rays in Dermatology* Dr. C. Guy Lane, Boston

Committeeman in-charge Dr. James A. Halsted, aids, Drs. Gerald J. Sullivan and Gerald Shelbly

#### SECTION OF PEDIATRICS

2 00 to 3 30 o'clock

Little Theater, Worcester Memorial Auditorium

Dr. Elmer W. Barron, Malden, *Chairman*

Dr. James M. Baty, Belmont and Boston, *Secretary*

1 *Non-Specific Therapy* Dr. Francis C. McDonald, Stoneham and Boston.

2 *Specific Therapy* Dr. Edward C. Curnen, Boston (by invitation) and Dr. John A. V. Davies, Boston.

Discussion Dr. Maxwell Finland, Boston.

Committeeman in-charge Dr. Augustus Thorndike, Jr., aids, Drs. Smith G. Philips and Harry B. Goodspeed.

#### SECTION OF RADIOLOGY AND PHYSIOTHERAPY

3 45 to 5 15 o'clock

Little Theater, Worcester Memorial Auditorium

Dr. Herman A. Osgood, Boston, *Chairman*

Dr. Edward C. Vogt, Boston, *Secretary*

- 1 *Physical Therapy in the Treatment of Fractures* Dr John S Coulter, professor of physical therapy, Northwestern University Medical School, Chicago, Illinois (by invitation)

- 2 *The Value of X Ray in the Treatment of Infections and Inflammatory Conditions* Dr Arthur U Desjardins, Mayo Clinic, Rochester, Minnesota (by invitation)

Committeeman in-charge Dr Edward J O'Brien, aids, Drs Herman L. Matern and Charles V King

8 00 o'clock

Ballroom, Hotel Bancroft

#### THE SHATTUCK LECTURE

*Epilepsy and the Cerebral Lesions of Birth and Infancy*  
Dr Wilder Penfield, Montreal, director, Montreal Neurological Institute and professor of neurology and neurosurgery, McGill University Faculty of Medicine, Montreal.

Light refreshments will be served after the lecture.

Committeeman in-charge Dr James A Halsted, aid, Dr Henry L Kirkendall.

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#### WEDNESDAY, JUNE 7

##### COMBINED MEETING

9 00 to 1 00 o'clock

Little Theater, Worcester Memorial Auditorium

Dr James C McCann, Worcester, *Chairman*  
Dr James A. Halsted, Dedham, *Vice Chairman*

9 00 o'clock

*Obstructing Lesions of the Large Bowel* Dr Richard B Cattell, Boston.

10 00 o'clock

*Cardiac and Circulatory Failure* Dr Arthur M. Fishberg, New York City (by invitation)

10 45 o'clock

*Diagnostic Services for Equine Encephalomyelitis* Dr Roy F Feemster, Massachusetts Department of Public Health.

11 00 o'clock

*Management of the Nervous Patient* Dr Walter C Alvarez, Mayo Clinic, Rochester, Minnesota (by invitation)

12 00 o'clock

*Endocrines and Endocrine Therapy in Gynecology* Dr Emil Novak, Baltimore (by invitation)

Committeeman in-charge Dr James A Halsted, aids, Drs Arthur C Brassau, Thomas Hunter, Edward Budnitz and Franklyn P Bousquet

#### SUPERVISING CENSORS ANNUAL MEETING

10 00 o'clock

Green Room, Worcester Memorial Auditorium

#### ANNUAL MEETING OF COUNCIL

10 30 o'clock

Stage, Worcester Memorial Auditorium

This meeting will be followed by the Cotting Luncheon to councilors Should the council meeting be prolonged, the councilors will reconvene for an adjourned meeting.

Notices of the meeting, with the order of business, will be mailed to councilors on May 29

Committeemen in-charge Council Meeting, Dr Richard P Stetson, aid, Dr George C. Tully, Cotting Luncheon, Dr Edward J O'Brien, aid, Dr Henry L. Kirkendall.

#### ROUND TABLE DISCUSSIONS

Worcester Memorial Auditorium

2 00 to 3 00 o'clock

#### LITTLE THEATER

*Cranio-cerebral Injuries* Chairman, Dr Donald Munro, Boston, collaborators Dr John S Hodgson, Boston, and Dr Joseph Hahn, Springfield

#### ROOM A

*Heart Disease* Chairman Dr Samuel A Levine, Boston, collaborators Dr Howard B Sprague, Boston, and Dr James Z Naurison, Springfield.

#### ROOM B

*Hyperthyroidism* Chairman Dr Howard M. Clute, Boston, collaborators Dr Lewis M. Hurvthal, Boston, and Dr Jacob Lerman, Boston.

3 00 to 4 00 o'clock

#### LITTLE THEATER

*Pneumonia* Chairman Dr Donald S King, Boston, collaborators Dr Raymond H Goodale, Worcester, and Dr Elliott S A. Robinson, Boston.

#### ROOM A

*Low Back Pain* Chairman Dr Louis E. Phaneuf, Boston, collaborators Dr John W O'Meara, Worcester, and Dr James B Ayer, Boston

#### ROOM B

*Peripheral Vascular Disease* Chairman Dr Reginald H. Smithwick, Boston, collaborators Dr John B. Sears, Boston, and Dr Robert R. Linton, Boston.

4 00 to 5 00 o'clock

#### LITTLE THEATER

*Urinary Infections at Different Ages* Chairman Dr E. Granville Crabtree, Boston, collaborators Dr Roger C Graves, Boston, and Dr Lester M Felton, Worcester



## ROOM A

*Neonatal Injuries* Chairman Dr Joseph W O Connor, Worcester, collaborators Dr James S P Beck, Worcester, and Dr Randolph K. Byers, Boston.

## ROOM B

*Adolescent Prepsychotic Conditions* Chairman Dr R. P. Kemble, Worcester, collaborators Dr George P Reynolds, Boston, and Dr Frederick Rosenheim, Boston.

Committeemen in-charge Little Theater, Dr James A Halsted, aids, Drs John T Carmody, John B Butts and Frank B Carr, Rooms A and B, Dr Augustus Thorndike, Jr, aids, Drs Carroll W Johnson, Edwin B Seelye, Leroy E. Mayo, Theodore B Massell, Edward S Ramsdell and Clifford Guptill.

## ANNUAL DINNER

7 15 o'clock

Ballroom, Hotel Bancroft

Tickets for the dinner (price \$1 00) should be obtained at the Registration Desk.

Committeeman in-charge Dr Edward J O'Brien, aid, Dr Charles A. Sparrow

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THURSDAY, JUNE 8

## SECTION OF OBSTETRICS AND GYNECOLOGY

9 00 to 10.30 o'clock

Little Theater, Worcester Memorial Auditorium

Dr Roy J. Heffernan, Boston, *Chairman*  
Dr M. Fletcher Eades, Boston, *Vice Chairman*  
Dr Raymond S. Titus, Boston, *Secretary*

- 1 *A Resume of Maternal Mortality Study in the State of Massachusetts for the Year 1938* The Secretary of the Section
- 2 *Rupture of the Uterus* Dr Frederick J. Lynch, Boston.
- 3 *Obstetric Analgesia* Dr Benjamin F. Cornwall, Salem  
Committeeman in-charge Dr William T. O'Halloran, aids, Drs Donald K. McClusky and Herbert E. Hedberg

## SECTION OF SURGERY

10 30 to 12 00 o'clock

Little Theater, Worcester Memorial Auditorium

Dr Benjamin H. Alton, Worcester, *Chairman*  
Dr Reginald H. Smithwick, Boston, *Secretary*

## SURGERY OF THE STOMACH AND DUODENUM

- 1 *Medical Aspects* Dr Chester M. Jones, Boston.
- 2 *Gastroscopic Examination* Dr Edward B. Benedict, Boston.
- 3 *X-Ray Examination* Dr William J. Elliott, Worcester

4 *Surgery of the Stomach* Dr Arthur W. Allen, Boston.

5 *Surgery of the Duodenum* Dr Frank H. Lahev, Boston.

Discussion by Dr Philemon E. Truesdale, Fall River, and Dr James C. McCann, Worcester

Committeeman in-charge Dr Richard P. Stetson, aids, Drs. John W. McKoan, Jr, and Earl E. Giffen

## ANNUAL MEETING

12 00 o'clock

Little Theater, Worcester Memorial Auditorium

Business of the Annual Meeting

Address by the President.

Annual Discourse *The Massachusetts Medical Society and Socialized Medicine* Dr Elliott P. Joslin, Boston

Committeeman in-charge Dr Augustus Thorndike, Jr, aid, Dr George C. Tully

At the close of the Annual Discourse, luncheon will be served to those who have obtained tickets at the Registration Desk.

Committeeman in-charge Dr William T. O'Halloran, aid, Dr Carroll W. Johnson

## LADIES PROGRAM

TUESDAY — JUNE 6

- 9 00—12 00 Registration, Worcester Memorial Auditorium.
- 12 00 Bus leaves main entrance of Auditorium for
  - 1 Luncheon at the Worcester Country Club
  - 2 The gardens of Mrs Emory and Mrs Gage in Shrewsbury
- 6 15 Dinner at the Worcester Club, 1 Oak Street.
- 8 00 Shattuck Lecture, Hotel Bancroft, by Dr Wilder Penfield, Montreal

WEDNESDAY — JUNE 7

- 9 00—12 00 Registration, Worcester Memorial Auditorium.
- 12 00 Bus will leave the Auditorium to take visitors to luncheon at the "Barn," Harvard, Massachusetts, and a tour of three museums
  - 1 Fruitlands (home of the Alcott family)
  - 2 Shaker Exhibit
  - 3 American Indian Museum

Tea will be served at the Museum Tea Room.

8 15 Ladies are invited to hear the speakers after the annual dinner of the Massachusetts Medical Society at the Hotel Bancroft. The gallery will be reserved for their use.

There will be no charge for any of the events. The women visitors will be the guests of the Massachusetts Medical Society and the Worcester District Medical Society

### MOVING PICTURES

Main Floor, Worcester Memorial Auditorium

Warren Sturgis, Director

TUESDAY — JUNE 6

- 10 00 *The Prevention and Treatment of Eclampsia*
- 10 45 *Complications of the Second Stage of Labor*
- 11 00 *The Treatment of Asphyxia Neonatorum*
- 11 30 *Intracranial Injuries of the Newborn*
- 12 00 *The Valves of the Heart in Action*
- 12 15 *The Heart Mechanism in Health and Disease*
- 12 30 *Ectopic Heart*
- 12 45 *Thrombi and Emboli*
- 1 00 *The Technic of Blood Transfusion*
- 1 30 *The Anemias*
- 2 00 *Intestinal Peristalsis*
- 2 15 *The Action of Drugs on Intestinal Motility*
- 2 30 *Bronchoscopy and Esophagoscopy on the Cadaver and on the Living*
- 2 45 *Obstructive Laryngitis*
- 3 00 *Oxygen Administration by the Oropharyngeal Catheter*
- 3 15 *Myasthenia Gravis*
- 3 30 *Teaching Diabetics*
- 3 45 *Development of the Fertilized Rabbit's Ovum*
- 4 00 *The Diagnosis and Treatment of Syphilis*
- 4 30 *A New Day (Pneumonia Serum Treatment)*

WEDNESDAY — JUNE 7

- 10 00 *Child Guidance Work*
- 10 15 *Reconstruction of Crippled Hands*
- 11 00 *Pneumonectomy*
- 11 15 *Empyema*
- 11 30 *Diagnostic Procedures in Tuberculosis*
- 11 45 *On the Firing Line (Tuberculosis Public Health Work)*
- 12 00 *Hernia Clinical and operative aspects*
- 12 30 *The Mechanics of Appendicitis*
- 12 45 *Appendectomy for Acute Gangrenous Appendicitis*
- 1 00 *Treatment of Burns*
- 1 30 *First Aid for Safe Transportation of Fractures of the Long Bones*
- 1 45 *Treatment of Fractures in Children*
- 2 00 *Bone Plating of Fractured Radius*
- 2 15 *Protruded Intervertebral Disk*
- 2 30 *Aftercare of Poliomyelitis*
- 3 00 *Lower Limb Amputation and Aftercare of the Patient*
- 3 30 *Human Sterility*
- 4 15 *The Aschheim-Zondek Pregnancy Test*
- 4 30 *Athetosis*

This program is subject to change without notice. The times given are approximate

### SCIENTIFIC EXHIBITS

Main Auditorium, Worcester Memorial Auditorium

- Cutaneous Manifestations of Syphilis* American Medical Association Booth A & B
- Medical Education* American Medical Association C
- Patent Medicines and Quackery* American Medical Association D & E
- A M A Council on Pharmacy and Chemistry* American Medical Association F
- A M A Council on Physical Therapy* American Medical Association G
- A M A Council on Foods* American Medical Association H
- Transurethral Resection of the Prostate and Roentgen Visualization of the Prostate and Urethra.* Drs Fletcher H Colby and Howard I Suby, Urological Service, Massachusetts General Hospital, Boston I
- Cancer* Pondville Hospital, Massachusetts Department of Public Health J
- The Background of Scientific Milk Production* Medical milk commissions of Boston, Worcester and Springfield K
- Fractures* Dr Gordon M Morrison, Boston L
- Cancer Teaching Exhibit* Boston Dispensary, New England Medical Center M & N
- Division of Child Hygiene* Massachusetts Department of Public Health O
- Services for Crippled Children* Massachusetts Department of Public Health P
- Dermatitis Artefacta and Dermatitis Factitia* Dr John G Downing, Boston Q
- Observations on the Effect of Insulin in Nondiabetic Malnutrition* Dr Harry Blotner, Medical Clinic of the Peter Bent Brigham Hospital, Boston R
- Roentgenological and Pathological Studies of Pulmonary Conditions* Rutland State Sanatorium, Rutland S
- Research in Mental Disease* Cardiotachometer and encephalogram Worcester State Hospital, Massachusetts Department of Mental Health T
- Urinary Pathology* Drs. Lester M. Felton, Walter D Bieberbach, Bancroft C Wheeler and Francis J Steele, Worcester U
- Lumbosacral Pathologic Lesions as Causes of Sciatica* Dr Charles E. Ayers, Worcester V
- Blind Nailing of Fractured Hips* Drs John W O'Meara, James A. Givan and Charles V King, Worcester W
- Bilateral Fractures of the Femur* Orthopedic Service, Worcester City Hospital X

### COMMERCIAL EXHIBITS

Main Auditorium, Worcester Memorial Auditorium

Booth No

- 1 Ernst Bischoff Company, Incorporated, Ivoryton, Connecticut.

In our exhibit we shall feature Activin, the first American produced shockless foreign protein for non-specific therapy, Alpha Lobelin, a direct stimulant to the respiratory tract and the resuscitant indicated in all forms of respiratory failure or depression, Dia-tussin, the original drop-dose cough remedy with a thirty five year record of efficacy, Silvogon, an absolutely stainless silver antiseptic, an effective gonocide, Styptysate, a vegetable hemostatic for the control of all seeping hemorrhages, Viscysate, a dialysate of viscum album which lowers blood pressure and relieves the accompanying symptoms

- 2 Philip Morris and Company, Limited, Incorporated, New York City

Philip Morris and Company will demonstrate the method by which it was found that Philip Morris Cigarettes, in which diethylene glycol is used as the hygroscopic agent, are less irritating than other cigarettes. Its representative will be happy to discuss researches on this subject, and problems on the physiological effects of smoking

- 3 Hynson, Westcott and Dunning, Incorporated, Baltimore, Maryland.

Hynson, Westcott and Dunning will have an exhibit featuring Mercurochrome and various pharmaceutical specialties of their manufacture. There will also be a display of some of the diagnostic apparatus and ampule solutions which have been developed in co-operation with physicians. As usual, competent representatives of the company will be in attendance to demonstrate the products and to answer questions. Literature and samples will be available to physicians who are not already familiar with products exhibited or who wish to obtain a trial supply

- 4 Moore and Company, Incorporated, Worcester, Massachusetts

Moore and Company will display pharmaceutical preparations and specialties all of which are guaranteed to be true to label and conform to the requirements of the federal and state laws pertaining to the standards and purity of drugs.

- 5 Campbell X Ray Corporation, Boston

Campbell X Ray Corporation will exhibit new methods of shock proofing X ray apparatus

- 6 The E. L. Patch Company, Stoneham, Massachusetts

The Patch Company representatives will be on hand throughout the meeting to greet physicians and to be of service in any way. The Patch Company exhibit will include Patch's Cod Liver Oil, as well as the other ethical medicinal specialties made in the Patch Laboratory

- 7 Kanef Drug Company, Worcester, Massachusetts

The Kanef Drug Company will exhibit pharmaceutical and biological products manufactured by Abbott Laboratories, Lederle Laboratories, Incorporated, Sharp and Dohme, and Winthrop Chemical Company, Incorporated.

- 8-9 The P. L. Rider Company, Worcester, Massachusetts.

The P. L. Rider Company will display a complete line of physicians office equipment, surgical instru-

ments, diagnostic instruments and specialties, as well as trusses, sacroiliac and abdominal supports, stockings, suction and pressure pumps, and electrical centrifuges

- 10 Eli Lilly and Company, Indianapolis, Indiana

Eli Lilly and Company feature an eight foot exhibit stressing the importance of liver extract in the treatment of pernicious anemia, Merthiolate (sodium ethyl mercuri thiosalicylate, Lilly) in the surgical and germicidal fields, Sodium Amytal (sodium iso-amyl ethyl barbiturate, Lilly) in the field of hypnoses, and Iletin (insulin, Lilly) in the management of diabetes mellitus. This is the first appearance of the Lilly Research Laboratories at the meetings of the Massachusetts Medical Society, the exhibit unit has been specially designed for state medical meetings.

- 11 Jones Metabolism Equipment Company, New York City

The Jones Metabolism Equipment Company presents the most modern metabolism apparatus on the market. The Jones Motor-Basal eliminates corrections for barometric pressure and room temperature, and eliminates calculations. It is so simple that anyone can learn to run it in a short time and yet is accurate enough to meet the most exacting requirements of research laboratories. An exclusive geometric device checks the accuracy of each test, thus eliminating the possible error caused by the human element. The Jones Motor-Basal is guaranteed to perform with an accuracy greater than 99 per cent for the lifetime of the purchaser

- 12 Davies, Rose and Company, Limited, Boston.

Members of the Massachusetts Medical Society are so well acquainted with the products of the laboratory of Davies, Rose and Company that no further explanation of their merits is really necessary. However, the company trusts that you will visit its booth and give its representatives the honor of greeting you. Messrs Mansfield and Fleming will be in attendance.

- 13 Baby's Dy Dee Service, Incorporated, Brookline, Massachusetts.

This exhibit explains in detail the specialized equipment and methods used in sterilizing and supplying diapers to homes in Greater Boston. Starting its sixth year, this service has relieved hundreds of mothers and nurses of the daily drudgery of washing diapers and baby clothes, at the same time protecting baby's health by scientific methods impossible at home. An economical service, devoted exclusively to the baby.

Represented by Mary Eustus Sturgis and Faye Reynolds Rand.

- 14-15 John Wyeth and Brother, Incorporated, Philadelphia

John Wyeth and Brother will display the following pharmaceutical specialties from their list of products: Kaomagma, an intestinal adsorbent particularly useful in checking diarrhea, Amphojel, Wyeth's aluminum hydroxide for the treatment of gastric hyperacidity and peptic ulcers, Silver Picrate Wyeth, used in the treatment of trichomonas vaginitis, Bewon Elvir, a palatable form of crystalline vitamin B<sub>1</sub>, Mucara a processed form of karaya gum used for

habitual constipation, and other products of general interest to practitioners and specialists

- 16 M and R Dietetic Laboratories, Incorporated, Columbus, Ohio

M and R Dietetic Laboratories will display Similac, a completely modified milk for infants deprived of breast feeding. Representatives will gladly explain its merit and suggested application.

- 17 E R Squibb and Sons, New York City

Physicians are cordially invited to visit the Squibb Exhibit. The complete line of Squibb vitamin, glandular, arsenical and biological products and specialties, as well as a number of interesting new items will be featured. Well informed Squibb representatives will be on hand to welcome you and to furnish any information desired on the products displayed.

- 18 Lea and Febiger, Philadelphia

Among the new books which Lea and Febiger will exhibit, in charge of Mr Paul Loveday, are Stimson's *Fractures and Dislocations*, Haden's *Hematology*, Miller's *Applied Anatomy*, Cowan's *Refraction of the Eye*, Schlanser's *Practical Otology, Rhinology and Laryngology*, Thorndike's *Athletic Injuries* and Brenner's *Pediatric Surgery*. New editions will be shown of MacKee's *X Ray Therapy*, Pohle's *Clinical Roentgen Therapy*, Pohle's *Theoretical Principles of Roentgen Therapy*, Crotts *Diseases of the Thyroid Parathyroids and Thymus*, Kovacs's *Electrotherapy and Light Therapy*, Ballenger's *Nose Throat and Ear*, Ivy and Curtis's *Fractures of the Jaw*, Brown's *The Surgery of Oral and Facial Diseases and Malformations* and Kanaval's *Infections of the Hand*.

- 19 H J Heinz Company, Pittsburgh.

Heinz Junior Foods, a new variety for older babies, are on display. The Heinz representative is ready to assist you to inspect this new product, as well as the Heinz Strained Foods, also on display. Register at the Heinz booth for helpful literature.

- 20 Mellin's Food Company, Boston

Opportunity will be offered for a discussion of the application of Mellin's Food in the feeding of infants whose individual condition sets them apart from so-called normal babies, and whose diet needs to be adjusted in a manner calculated to correct their digestive disturbance. Mellin's Food is worthy of attention for it has occupied an outstanding position in the field of pediatrics ever since the beginning of the study of the art and science of infant feeding.

- 21 The Borden Company, New York City

Full information on Biolac, the new liquid modified milk for infants, will be available at the Borden booth. Also exhibited will be other Borden products for infant feeding, notably Kilm, Dryco, Beta Lactose, Merrell-Soule products and Borden's Silver Cow Evaporated Milk.

- 22 Crosbie-Macdonald, Boston

We represent the United States Fidelity and Guaranty Company, writing physician's liability insurance for members of the Massachusetts Medical Society. Either George H. Crosbie, Edward J. O'Neil, Jr., or

Arthur H. Crosbie will be on hand at all times to discuss any questions pertaining to insurance and to quote rates for your specialty. We are notaries public, and should be glad to sign and file your narcotic drug blanks.

- 23-24 Pet Milk Company, Saint Louis, Missouri.

An actual working model of a milk-condensing plant in miniature will be exhibited by the Pet Milk Company. This exhibit offers an opportunity to obtain information about the production of Irradiated Pet Milk and its uses in infant feeding and general dietary practice. Miniature Pet Milk cans will be given to each physician who visits the Pet Milk booths. Our representatives, Mr D. O. Tracy and Mr G. F. Whalen, will be in charge of the exhibit.

- 25 Tailby-Nason Company, Boston.

Tailby-Nason Company has reserved space for the exhibit of Nason's Palatable Cod Liver Oil, made in the company's own plants in the Lofoten Islands of Norway, romantic Land of the Midnight Sun.

More and more leading physicians are relying on good cod liver oil in all cases requiring vitamins A and D. Nason's Oil is prescribed and recommended by leading pediatricians from the Atlantic to the Pacific for its high vitamin potency and unusual palatability.

- 26 S.M.A. Corporation, Cleveland, Ohio

This interesting new display represents the selection of infant feeding and vitamin products of the S.M.A. Corporation. Physicians who visit this exhibit may obtain complete information, as well as samples, of S.M.A. powder and special milk preparations—Protein S.M.A. (Acidulated), Alerdex and Hypo-Allergic Milk.

- 27 The Arlington Chemical Company, Yonkers, New York.

Again The Arlington Chemical Company will feature its biological and pharmaceutical products. They are offering a \$9.75 diagnostic protein outfit, consisting of eighty of the commonest causative factors in allergic conditions, also a full line of food and fungus proteins and pollen extracts for diagnosis and desensitization. The representative in charge of the exhibit will be glad to discuss any allergic problem.

- 28 Smith, Kline and French Laboratories, Philadelphia.

Smith, Kline and French Laboratories, believing that many physicians dislike efforts to make them register, have arranged their booth for self service. Information about Benzedrine Inhaler, Benzedrine Sulfate Tablets, Benzedrine Solution, Pentnucleotide, Feosol Tablets, Feosol Elixir, Oxo-ate B Tablets and Eskay's Neuro Phosphates may be obtained from the convenient literature dispenser. If additional information is desired, the representative will be glad to answer any questions.

- 29 J. Sklar Manufacturing Company, Brooklyn, New York

The Sklar Manufacturing Company exhibit will feature new suction and pressure apparatus, including the improved Tompkins portable rotary compressor, the de luxe Tompkins, the new Imperator apparatus.

for ear, nose and throat work, the Ralks Ideal Unit and the Moorhead unit for office and clinic, and the new, improved heavy-duty hospital model of the Bellevue suction and pressure unit. The Sklar Company will also exhibit its extensive line of American made stainless-steel surgical instruments, as well as special apparatus, such as the Davidson pneumothorax apparatus, the Sorest blood transfuser, and so forth

### 30 The Macmillan Company, New York City

You are cordially invited to visit the exhibit of the Macmillan Company. On display at this booth you will find two outstanding new medical books, which the Macmillan representative will be glad to discuss with you. One is *The Experimental and Clinical Use of Sulphamylamide Sulphapyridine and Allied Compounds* by Perrin H Long, M.D., and Eleanor A. Bliss, Sc.D. The timeliness of the subject and the unquestionable authority of the authors should give this book an immediate claim to your attention. The other is *Otolaryngology in General Practice* by Lyman Richards, M.D. An examination of the books with their unique arrangement and fine illustrations will impress you with their practical helpfulness.

Also on display will be the new fifth edition of Dr Hans Zinsser's *Resistance to Infectious Diseases* now significantly entitled *Immunity Principles and application in medicine and public health* and written in collaboration with John F Enders, Ph.D., and LeRoy D Fothergill, M.D.

### 31 J B Lippincott Company, Philadelphia.

Among the newer Lippincott publications on display are the phenomenally successful Thorek's *Modern Surgical Technique* and Kracke's *Diseases of the Blood and Atlas of Hematology* from which illustrations are being displayed at the World's Fair Medical Exhibit. Other important new works include Rigler's *Outline of Roentgen Diagnosis* Barborak's *Treatment by Diet* and Imperatori's *Diseases of the Nose and Throat*.

### 32. The Alkalol Company, Taunton, Massachusetts

The Alkalol Company will exhibit two preparations Alkalol, a carefully balanced solution of alkaline and saline salts and essential oils, which is especially prepared for use on mucous membranes or on inflamed or irritated tissues, and Irrigol a powder which makes an alkaline, saline, non toxic solution and is valuable for vaginal douches, rectal enemas or colonic irrigations.

### 33 Frederick Stearns and Company, Detroit, Michigan

Frederick Stearns and Company will exhibit their Neo-Synephrin products Mucilose, Trimax, Apple Powder and Gastric Mucin and will feature their newly developed product—Solution Zinc Insulin Crystals Stearns. Mr J P Burfeind will be in charge.

### 34 Parke Davis and Company, Detroit, Michigan

Members of the staff of Parke Davis and Company will be at your service to tell you about some of their research staff's numerous scientific accomplishments. Mapharsen, Adrenalin, Pitocin, Pitressin, Theelin, Theelol and biological products will be a part of this attractive exhibit.

### 35 Petrolagar Laboratories Incorporated, Chicago

Petrolagar Laboratories offer, in addition to samples of the five types of Petrolagar, an interesting selection

of descriptive literature and anatomical charts. Ask the Petrolagar representative, Mr E M Tarplin or Mr G E Schneider, to show you the new *Habit Time* booklet. It's a welcome aid for teaching bowel regularity to your patients.

### 36 General Electric X Ray Corporation, Boston.

The General Electric X Ray Corporation will exhibit a miniature model darkroom, an electrocardiograph and a portable x ray machine.

### 37 White Laboratories, Incorporated, Newark, New Jersey

The White Laboratories will present information covering the entire field of cod liver oil concentration, together with clinical data and evidence concerning the therapeutic efficacy of its Cod Liver Oil Concentrate, in liquid, tablet and capsule form. Informed representatives and descriptive literature, reprints and excerpts will further demonstrate cod liver oil efficacy, and point out the contributions of White Laboratories in the vitamin A and vitamin D field.

White Laboratories is the world's largest manufacturer of cod liver oil concentrates and is one of the largest users of cod liver oil for pharmaceutical purposes in the world. All physicians are cordially invited to visit the booth.

### 38 Westinghouse X Ray Company, Incorporated, Long Island City, New York.

The Westinghouse X Ray Company will exhibit several new diagnostic x ray items that will be of interest to all who are doing x ray work. There will be shown for the first time an automatic head clamp which was originally developed at Temple University and has proved to be of great value to radiologists and therapists.

### 39 American Hospital Supply Corporation, Chicago

The new simple Baxter blood transfusion set will be shown. See the Baxter Vacoliter, the same intravenous solution used exclusively by many teaching institutions and by over half of all American hospitals. Investigate Coli Bactragen, it *does* prevent peritonitis. Let us demonstrate the Oxygenaire and the Tomac oxygen insufflator. Look over the automatic apparatus for continuous Wangenstein suction. *Don't miss this booth*.

### 40 Lee De Forest Laboratories, represented by the New England X Ray Corporation, Boston.

Lee De Forest Laboratories will demonstrate the ultimate in radiotherapy and radiosurgery, designed and built by radio scientists and engineers. Mr George Laben will be in charge of the exhibit.

### 41 Mead, Johnson and Company, Evansville, Indiana

Three new Mead products are on display at Mead Johnson and Company's booth. Mead's Thiamin Chloride Tablets, Mead's Cevitanic Acid Tablets, Mead's Nicotinic Acid Tablets. Olac for feeding premature babies is also shown, as well as the complete line of Mead's infant-diet materials.

### 42 Lederle Laboratories Incorporated New York City

Lederle Laboratories will exhibit a full line of biologicals and pharmaceutical specialties featuring the new drug sulfapyridine.

- 43 Winthrop Chemical Company, Incorporated, New York City

The Winthrop Chemical Company extends a cordial invitation to every member of the Massachusetts Medical Society to visit its booth where representatives will gladly discuss the latest preparations made available by this firm. You will receive valuable booklets dealing with anesthetics, analgesics, anturachitics, antispasmodics, antisyphilitics, diagnostics, diuretics, hypnotics, sedatives and vasodilators.

- 44 Surgeons' and Physicians' Supply Company, Boston

The Surgeons' and Physicians' Supply Company will exhibit the new Complex short-wave apparatus, with cable, and other new and interesting items, both in the line of instruments and in that of general supplies.

- 45 Riedel-de Haen, Incorporated, New York City

Riedel-de Haen, the pioneers in bile acid research, will feature the bile-acid products, Decholin, Decholin Sodium and Degalol. The hypnotics Pernoston and Pernoston Sodium will also be shown, as well as Sigmodal, the soporific for rectal administration in obstetrics and surgery.

- 46 Gerber Products Company, Fremont, Michigan

The new Gerber Cereal Food, dry, pre-cooked, will be shown to you at the Gerber booth. Samples and professional literature about this cereal product, as well as the other Gerber baby foods, will be available to you.

- 47 Picker X-Ray Corporation, Boston

To the roentgen profession the name of Picker-Waite has always been synonymous with progress. The first successful shockproof x-ray apparatus ever built was of Waite invention. Production facilities plus the combined resources of the Picker-Waite organization, with an electrical and mechanical engineering background of over fifty nine years, have made it possible to produce x-ray equipment at a modest cost.

One of the most outstanding pieces of Picker-Waite equipment is the Picker-Waite Century (100 milliamperes—100 kilovolts), which has been presented to the medical profession as a truly modern diagnostic x-ray apparatus—introducing for the first time an entirely new principle of flexibility in radiographic-fluoroscopic x-ray design and development. Point for point and dollar for dollar the Picker-Waite Century is easily the most outstanding value in diagnostic x-ray equipment offered to a discriminating clientele. We are proud to exhibit this unit with many new and outstanding smaller accessory devices at the meeting of the Massachusetts Medical Society. Bulletins and descriptive literature may be obtained at our booth.

- 48 Horlick's Malted Milk Corporation, Racine, Wisconsin

Nourishing, digestible, appetizing—these are the three outstanding qualities for which Horlick's Malted Milk is famous, whether in powder or tablet form. Visit the exhibit. You will be interested in the many uses from infant feeding to old age, note especially the convenience of the tablets in ulcer diets.

- 49 50 Brewer and Company, Incorporated, Worcester, Massachusetts

Thesodate (Brewer) will be featured at the booth of Brewer and Company. Since the introduction of this product one year ago, it has become the xanthine of choice with many physicians. For information and a liberal supply for clinical trial, register at the Brewer booth.

- 51 G. D. Searle and Company, Chicago.

Products of research, originated in the Searle laboratories, will be the feature of the exhibit of G. D. Searle and Company. Particularly interesting are the recent work on the bile acids and information on the use of Aminophyllin-Searle, as well as the display of Bis-muth Sodium Tartrate-Searle.

52. Hanovia Chemical and Manufacturing Company, Newark, New Jersey

While at the convention do not fail to call at the Hanovia booth. There will be a complete line of the most modern equipment, consisting of ultraviolet quartz lamps with special treatment control, short wave heat generators, Sollux radiant heat lamps and Safe T Air ultraviolet lamps for air sanitation. Courteous and competent representatives will be on hand to welcome you.

- 53 Bilhuber-Knoll Corporation, Jersey City, New Jersey

New reports on the fine medicinals of the Bilhuber-Knoll Corporation are always of interest. Its products include Dilaudid Hydrochloride, an opiate for pain and cough, the well tolerated purine salts, Theocalan and Phyllicin, so useful in the treatment of heart diseases, the cardiorespiratory restorative, Metrazol, of value as an antidote to depressant drugs, for denarcotization after anesthesia, and in the emergencies of heart failure, and the non-barbiturate sedative and hypnotic, Bromural.

Well informed representatives will be in attendance to discuss the new reports with interested physicians.

- 54 The Liebel Flarsheim Company, Cincinnati, Ohio

The Liebel Flarsheim Company will exhibit a complete line of the well known L-F short wave generators, as well as the famous Bovie electrosurgical units. In addition, other new and useful physiotherapy apparatus will be shown. A cordial invitation is extended to visit the Liebel Flarsheim booth in order to inspect this new apparatus and have it demonstrated to you.

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The Sandoz Chemical Works will feature the following preparations: Gynergen (ergotamine tartrate) for the dramatic relief of migraine, Calglucon (calcium gluconate) granules, effervescent tablets and chocolate flavored tablets, Neo-Calglucon, a new highly water soluble derivative of calcium gluconate, for parenteral calcium therapy, the three reliable bella donna products, Bellafoline, Belladonal and Bellergal, Calcibronat, an organic combination of calcium and bromine, Quinine-Calcium, Sandoz, Scillaren and Scillaren B, the cardioactive principle of squill (*Urginea maritima*), Digilanid, the crystallized initial glucosides of *Digitalis lanata* Basergin, a stable preparation of pure ergonovine, Neo-Gynergen, a combination of ergotamine and ergonovine for obstetric and gynecological use.

## 56-57 E. F. Mahady Company, Boston

The exhibit of the E. F. Mahady Company includes the latest developments in physical therapy equipment manufactured by the Burdick Corporation, as well as Cutter's intravenous solutions in Safufask dispensers, new surgical instruments and medical books

## 58 The C B Fleet Company, Incorporated, Lynchburg Virginia.

Phospho-Soda (Fleet) is a highly concentrated and purified, aqueous solution of sodium phosphates. It is non toxic, rapid and mild in action without irritation of the gastric or intestinal mucosa. It is indicated for hepatic dysfunction, and for its thorough eliminating and cleansing action on the upper and lower intestines. The C B Fleet Company thanks the medical profession for the broader usage now being given to Phospho-Soda (Fleet). Its prompt, acceptable and controllable action makes it an exceptionally efficient laxative saline and cholagogue.

Mr R. S. Carman will again extend our courtesies

## 59 The Medical Protective Company, Wheaton, Illinois

The most exacting requirements of adequate liability protection are those of the professional liability field. The Medical Protective Company, specialists in providing protection for professional men, invites you to confer, at its exhibit, with the representative there. He is thoroughly trained in professional liability under writing.

## 60 The Coca-Cola Company, Atlanta, Georgia.

The Coca-Cola Company in serving complimentary Coca-Cola at its booth hopes that "The Pause That Refreshes" will be enjoyed by guests and visitors of the meeting.

## 61 Kalak Water Company of New York, Incorporated, New York City

Visit the exhibit of the Kalak Water Company and test for yourself the palatability of this delicious, sparkling, neutralizing agent when served properly cooled. Kalak Water has been used by the profession for almost a quarter of a century to re-establish and maintain the alkali reserve and also to supply fluid to patients without producing overloading of the circulation. Because Kalak presents a proper balance of buffer salts, such as the bicarbonates of sodium, calcium and magnesium, it is ideally suited for use in buffering the untoward effects of sulfanilamide or sulfapyridine. Ask the Kalak representative for literature covering the buffering value of Kalak. It is important to remember that Kalak Water is not a laxative.

## 62 Jetter and Scheerer Products, Incorporated, New York City

The world famous line of Jetter and Scheerer surgical instruments will be exhibited again this year. A large variety of both rustless-steel and chrome plated instruments will be displayed, including many unusual and special items. The Jetter and Scheerer line has been held in highest esteem by surgeons since 1867 and is still considered to be the standard for which all others aim. You are cordially invited to visit our booth.

## 63 Sharp and Dohme, Incorporated, Philadelphia.

Sharp and Dohme will feature their well known Propadrine Hydrochloride products. There will also be on display a group of pharmaceutical specialties and biologicals prepared by this house. Capable, well-informed representatives will be on hand to welcome physicians and furnish information on Sharp and Dohme products.

## 64 Abbott Laboratories, North Chicago, Illinois

A hearty welcome awaits you in the Abbott booth where a comprehensive assortment of Abbott specialties is on display. Abbott trained representatives will be glad to answer questions and to discuss their newer products with you.

## BOSTON UNIVERSITY SCHOOL OF MEDICINE ALUMNI ASSOCIATION

A meeting and luncheon of the Boston University School of Medicine Alumni Association will be held at 12:30 p. m., Tuesday, June 6, at the Hotel Bancroft. The charge for the luncheon will be \$1.00.

## HARVARD MEDICAL ALUMNI ASSOCIATION

The annual meeting and luncheon of the Harvard Medical Alumni Association will be held at 12:30 p. m., Tuesday, June 6, at the Hotel Bancroft. The charge for the luncheon will be \$1.00.

## MASSACHUSETTS MEDICO-LEGAL SOCIETY

A meeting of the Massachusetts Medico-Legal Society will be held at 2:00 p. m., Wednesday, June 7, in the Female Chorus Room, Second Floor, Worcester Memorial Auditorium.

## TUFTS COLLEGE MEDICAL SCHOOL ALUMNI

The annual luncheon of the Tufts College Medical School Alumni Association will be held at 12:00 noon, Tuesday, June 6, on the Stage of the Worcester Memorial Auditorium. Members and guests are invited.

## SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## BLEEDING IN THE PUERPERIUM

Mrs. A. K., a thirty-two-year-old gravida I, was delivered by low forceps on March 30, 1934.

The family history was non-contributory. The patient had had pneumonia as a child. She had never undergone an operation. Catamenia began at thirteen, were regular with a twenty-eight-day cycle, and lasted three to five days without pain.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

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these and other sponsors of exhibits in the main exhibition halls may meet members of the medical and allied professions under pleasant circumstances

The medical and public-health exhibit, being both scientific and educational, comprises probably the largest single enterprise of its kind ever undertaken specifically for adult health education. The exhibit is in two sections. A vast Hall of Man, which sets forth in unique fashion essential information on human anatomy and physiology, is under sponsorship of the American Museum of Health, with generous assistance from a number of philanthropic foundations and public spirited life insurance companies and commercial institutions. Adjoining the Hall of Man is the Hall of Medical Science and Public Health, an outstanding collection of exhibits on such subjects as tuberculosis, pneumonia, syphilis and maternity and child health.

Local physicians, public health workers and allied professionals will utilize the club to entertain out-of-town guests brought here by the many meetings of national and international groups to be held in New York during the fair. Members of the International Congress of Microbiology meeting in September, 1939, to use one example, may turn to the club not only for information regarding the medical and public-health resources in and about New York City, but for guidance in seeking authoritative local sources of information on the latest developments in technical aspects of their specialized fields.

Management of the club is vested in a board of directors which includes officers of the county medical societies of the five boroughs constituting the City of New York and of adjacent Westchester and Nassau counties. It is a non-profit membership organization, incorporated under the laws of New York State.

## NOTES

Among the fifteen scientists elected to membership at the annual meeting of the National Academy of Scientists were Dr William B. Castle and Dr A. Baird Hastings, of Boston. The former is professor of medicine and the latter Hamilton Kuhn Professor of Biological Chemistry at the Harvard Medical School.

Dr Leroy M. S. Miner, dean of the Harvard Dental School and former president of the American Dental Association, was recently awarded the Jarvie Fellowship Medal by the Dental Society of the State of New York. This medal is presented each year in recognition of outstanding contributions to the dental profession.

## CORRESPONDENCE

### SELECTION OF ORATOR

*To the Editor* I note in the proposed amendments to the by laws of the Massachusetts Medical Society, a suggested change in Chapter IV, Section 3, which limits the selection of the orator for the annual meeting to members of the Council. It is very difficult for me to see any rationale for such limitation. I assume that the society wishes for its annual orator the most effective and capable man for this particular job. It is perfectly reasonable that the most desirable man would usually be a member of the Council, but this does not necessarily follow. For these reasons I should question the desirability of this part of the amendment.

HENRY A. CHRISTIAN, M.D.

721 Huntington Avenue,  
Boston.

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of March 31 the following have been accepted

### Abbott Laboratories

Tablets Barbitol Sodium — Abbott, 5 gr

### Armour Laboratories

Suprarenalin Solution 1:1000 in 1 cc Ampules (for hypodermic use)

Suprarenalin Solution 1:1000 in 10 cc. Vials (for hypodermic use)

Suprarenalin Solution 1:1000 in 1 oz Bottles (for hypodermic use)

### Cutter Laboratories

Ampules Iodobismutol with Saligenin, 2 cc.

### Gane's Chemical Works, Inc.

Racephedrine Hydrochloride

### The National Drug Co

Undulant Fever Vaccine (Abortus and Suis)

Undulant Fever Vaccine (Melitensis)

### Sharp & Dohme

Antipneumococcic Serum Type II, Refined and Concentrated — Mulford

Antipneumococcic Serum Type VII, Refined and Concentrated — Mulford

### The Upjohn Company

Ampule Solution Sodium Morrhuate 5 per cent with Benzyl Alcohol 2 per cent, 2 cc

Solution Sodium Morrhuate 5 per cent with Benzyl Alcohol 2 per cent, 30 cc. vials

Ampule Solution Sodium Morrhuate 10 per cent with Benzyl Alcohol 2 per cent, 2 cc.

Solution Sodium Morrhuate 10 per cent with Benzyl Alcohol 2 per cent, 30 cc. vials

Tablets Sulfanilamide, 5 gr

Tablets Sulfanilamide, 7½ gr

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,  
Chicago, Illinois

## REPORTS OF MEETINGS

### HOSPITAL RESEARCH COUNCIL

A meeting of the Hospital Research Council of the Massachusetts General Hospital was held on Tuesday, January 31, in the Ether Dome of the Massachusetts General Hospital, Dr Arthur W. Allen presiding.

The program was opened by Dr Samuel Hertz, who spoke on Radioactive Iodine. Dr Hertz began by describing the method of measurement, using the Geiger counter, to record the amount of radioactivity emanated. The electrons set off a high voltage spark across a gap in a chamber containing air under reduced pressure by ionizing this air. The electrons pass in through a window in the chamber. The electrical discharges are converted into sounds, which can be counted and recorded. The amount of radioactivity in a test substance, then, is in proportion to the number of sounds given off by the counter.

There are five known isotopes of iodine and probably more which have not been identified. These can be made radioactive by subjecting them to bombardment from a

Her last period was August 6, 1933, making her due for delivery early in May

The patient was seen routinely throughout her pregnancy. Her blood pressure never went above 128 systolic, 66 diastolic, and her urine on only one occasion showed a very slight trace of albumin

Ten days after delivery she began to flow very freely. When seen about half an hour after the flowing had started, the pulse was 100, and the blood pressure 100 systolic, 60 diastolic. She looked poorly, but as she was not flowing when seen, the uterus was not invaded. Intravenous glucose was given, and a transfusion postponed. It was believed that the bleeding was due to a piece of placenta which had not been extruded at the time of labor. The next morning her temperature was 101.6°F, having been normal before the bleeding episode. She was passing small pieces of what appeared to be retained placenta. The temperature was normal the following day.

On the next day, April 12, the patient again began to bleed very freely. She was given posterior pituitary extract, ergot and morphine. The blood pressure was 118 systolic, 70 diastolic, and the pulse 100. Under nitrous oxide, oxygen and ether anesthesia a large piece of placenta was found extruding from the cervix. This was removed manually, as were other pieces which were adherent. An alcohol pack was left in the uterus, with the hope that if anything had been left behind it would come away on the pack when removed. The pack was removed the following morning, and because of her anemia, — the hemoglobin was 40 per cent, and the red-blood-cell count 1,280,000, — transfusion was performed, a professional donor being used. Subsequent convalescence was uneventful. On April 14 the hemoglobin was 35 per cent, and the red-blood-cell count 1,090,000, and on April 17, 60 per cent and 2,360,000. There was no further rise in temperature and no more bleeding occurred. She was discharged on April 20.

*Comment.* The treatment of this particular case is open to just criticism. Even though the initial bleeding had ceased when the patient was seen, it was evident that a great deal of blood had been lost. She should have been transfused at that time, and the pieces of tissue removed. This would have prevented the second hemorrhage which resulted in a marked anemia. It must be borne in mind that any patient who bleeds nine or ten days following the birth of a baby does so because of some abnormality inside the uterus. Whether one procrastinates and does not invade the uterus should depend entirely on the amount

of bleeding. If the bleeding is slight, oxytocics may be used successfully, if the bleeding is profuse and no pieces of tissue are observed in the blood which is passed, one must infer that foreign material still remains.

Hemorrhage is the only indication for entering the uterus after delivery, and while one should be conservative about it, one must appreciate that any of these cases may continue to bleed until the uterus is invaded and freed of its foreign material. It is possible in such cases that an accreta is the underlying cause, if so, hysterectomy is the treatment of choice. The majority of delayed hemorrhages, however, are caused by pieces of partially adherent placenta, and these can almost invariably be removed with the fingers or with ovum forceps. Curettage, if employed, should be most delicate, and sharp instrumentation should always be avoided. Transfusion is an extremely important adjunct to intrauterine instrumentation.

## MISCELLANY

### THE PROFESSIONAL CLUB

Physicians, public health workers, medical scientists and other professionals visiting the New York World's Fair 1939 will find reserved for their exclusive use the Professional Club, where members have a place to meet their colleagues in quiet, congenial surroundings.

Unique to this or any other world's fair, the club occupies an area of 5000 square feet on the main floor of the Medical and Public Health Building, which is located on the Theme Plaza, its main entrance being directly opposite the Helicline leading around the Perisphere to the Trylon, where much of importance takes place daily.

The visitor will find awaiting him a comfortable lounge, attractively decorated and furnished, a bar and a snack bar, checking facilities, rest rooms, stenographic service, telephones and other conveniences of a private club.

Membership in the club is limited to accredited members of the medical and public health and allied professions and to representatives of exhibit sponsors. Professional members pay no dues, but there is a small certification charge to cover the cost of validating credentials. Among the organizations whose membership cards entitle their owners to admittance to and use of the club are American Dental Association, American Dental Hygienists Association, American Dietetic Association, American Hospital Association, American Medical Association, American Medical Library Association, American Nurses Association, American Pharmaceutical Association, American Public Health Association, American Veterinary Medical Association, Association of Women in Public Health, Catholic Hospital Association, National League of Nursing Education, National Organization for Public Health Nursing, Pan American Medical Association, Incorporated, United States Department of Agriculture Bureau of Animal Industry, and the United States Public Health Service.

Products of manufacturers sponsoring scientific and educational exhibits in the Medical and Public Health Building are on display in showcases set artistically into the walls of the lounge. The club serves as a place where

these and other sponsors of exhibits in the main exhibition halls may meet members of the medical and allied professions under pleasant circumstances.

The medical and public health exhibit, being both scientific and educational, comprises probably the largest single enterprise of its kind ever undertaken specifically for adult health education. The exhibit is in two sections. A vast Hall of Man, which sets forth in unique fashion essential information on human anatomy and physiology, is under sponsorship of the American Museum of Health, with generous assistance from a number of philanthropic foundations and public spirited life insurance companies and commercial institutions. Adjoining the Hall of Man is the Hall of Medical Science and Public Health, an outstanding collection of exhibits on such subjects as tuberculosis, pneumonia, syphilis and maternity and child health.

Local physicians, public health workers and allied professionals will utilize the club to entertain out-of-town guests brought here by the many meetings of national and international groups to be held in New York during the fair. Members of the International Congress of Microbiology meeting in September, 1939, to use one example, may turn to the club not only for information regarding the medical and public-health resources in and about New York City, but for guidance in seeking authoritative local sources of information on the latest developments in technical aspects of their specialized fields.

Management of the club is vested in a board of directors which includes officers of the county medical societies of the five boroughs constituting the City of New York and of adjacent Westchester and Nassau counties. It is a non-profit membership organization, incorporated under the laws of New York State.

## NOTES

Among the fifteen scientists elected to membership at the annual meeting of the National Academy of Scientists were Dr. William B. Castle and Dr. A. Baird Hastings, of Boston. The former is professor of medicine and the latter Hamilton Kuhn Professor of Biological Chemistry at the Harvard Medical School.

Dr. Leroy M. S. Miner, dean of the Harvard Dental School and former president of the American Dental Association, was recently awarded the Jarvie Fellowship Medal by the Dental Society of the State of New York. This medal is presented each year in recognition of outstanding contributions to the dental profession.

## CORRESPONDENCE

### SELECTION OF ORATOR

*To the Editor* I note in the proposed amendments to the by laws of the Massachusetts Medical Society, a suggested change in Chapter IV, Section 3, which limits the selection of the orator for the annual meeting to members of the Council. It is very difficult for me to see any rationale for such limitation. I assume that the society wishes for its annual orator the most effective and capable man for this particular job. It is perfectly reasonable that the most desirable man would usually be a member of the Council, but this does not necessarily follow. For these reasons I should question the desirability of this part of the amendment.

HENRY A. CHRISTIAN, M.D.

721 Huntington Avenue,  
Boston.

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of March 31 the following have been accepted

### Abbott Laboratories

Tablets Barbitol Sodium — Abbott, 5 gr

### Armour Laboratories

Suprarenalin Solution 1 1000 in 1 cc. Ampules (for hypodermic use)

Suprarenalin Solution 1 1000 in 10 cc. Vials (for hypodermic use)

Suprarenalin Solution 1 1000 in 1 oz. Bottles (for hypodermic use)

### Cutter Laboratories

Ampules Iodobismutol with Saligenin, 2 cc.

### Gane's Chemical Works, Inc.

Racephedrine Hydrochloride

### The National Drug Co.

Undulant Fever Vaccine (Abortus and Suis)

Undulant Fever Vaccine (Melitensis)

### Sharp & Dohme

Antipneumococcic Serum Type II, Refined and Concentrated — Mulford

Antipneumococcic Serum Type VII, Refined and Concentrated — Mulford

### The Upjohn Company

Ampule Solution Sodium Morrhuate 5 per cent with Benzyl Alcohol 2 per cent, 2 cc.

Solution Sodium Morrhuate 5 per cent with Benzyl Alcohol 2 per cent, 30 cc. vials

Ampule Solution Sodium Morrhuate 10 per cent with Benzyl Alcohol 2 per cent, 2 cc.

Solution Sodium Morrhuate 10 per cent with Benzyl Alcohol 2 per cent, 30 cc. vials

Tablets Sulfanilamide, 5 gr

Tablets Sulfanilamide, 7½ gr

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,  
Chicago, Illinois.

## REPORTS OF MEETINGS

### HOSPITAL RESEARCH COUNCIL

A meeting of the Hospital Research Council of the Massachusetts General Hospital was held on Tuesday, January 31, in the Ether Dome of the Massachusetts General Hospital, Dr. Arthur W. Allen presiding.

The program was opened by Dr. Samuel Hertz, who spoke on Radioactive Iodine. Dr. Hertz began by describing the method of measurement, using the Geiger counter, to record the amount of radioactivity emanated. The electrons set off a high voltage spark across a gap in a chamber containing air under reduced pressure by ionizing this air. The electrons pass in through a window in the chamber. The electrical discharges are converted into sounds which can be counted and recorded. The amount of radioactivity in a test substance, then, is in proportion to the number of sounds given off by the counter.

There are five known isotopes of iodine and probably more which have not been identified. These can be made radioactive by subjecting them to bombardment from a

neutron source. The course of such a radioactivated compound after injection can be traced in its distribution to the various tissues in the body. The experiment consisted of injecting radioactive iodine compounds into rabbits, which had been treated previously with anterior pituitary extract to render the thyroid gland hyperplastic. Fifteen minutes later the rabbits were killed and the various tissues tested with the Geiger counter.

It was found that the thyroid gland contained 38 arbitrary units, whereas the spleen contained only 2, the liver 4, the pituitary gland 0, muscle 0, and the urine 48 (due to the excretion of the iodide). Dr Hertz presented a chart showing the rate of absorption by various types of thyroid gland. The markedly hyperplastic gland is much more able to attract the iodine than is the normal thyroid. After the first fifteen or twenty minutes only a small amount of iodide is further attracted. Dr Hertz suggested that this might prove to have applications of distinct value in estimating thyroid disorders.

This work was undertaken in collaboration by the Massachusetts Institute of Technology and the Thyroid Clinic of the Massachusetts General Hospital. The discussion further revealed that a good many chemical and biological substances can be made radioactive.

The next paper, on 'Prostigmin,' was presented by Dr Henry R. Viets. Dr Viets reviewed the history of myasthenia gravis. It is a very rare disease, the first case at the Massachusetts General Hospital having been seen in 1905. From 1905 to 1935, 30 clear-cut cases were recorded. A quarter of these died in the hospital, the fate of the remainder being largely unknown. Many probably died within two to five years after being seen. Since 1935 there have been 44 cases treated at the hospital, and 6 or 10 more outside. This sudden jump in admissions is the result of the discovery of the action of the drug, Prostigmin, in 1934, it relieved the principal symptoms almost immediately.

Textbooks to the contrary, myasthenia gravis is not a disease of young people, it can occur in persons aged sixty or seventy. The disease is as serious as it ever was, but the mortality has been markedly reduced following treatment with Prostigmin. Other drugs are by no means as effective. The disease is characterized by remissions and relapses, the drug tides over the relapses to stages of remission, thus saving lives. Physiological studies are to be carried out in the near future.

Dr Arturo Rosenblueth, in opening the discussion of Dr Viets's paper, reported some work on the physiology of the disease. An important step in the transmission of stimuli from motor nerve to muscle is the release of acetylcholine at the neuromuscular junction. Wherever acetylcholine is thus liberated, there must be an enzyme, esterase, that splits it to form acetic acid and choline, releasing its effect. Prostigmin prevents or stops the action of this esterase. The question is whether myasthenia gravis is due to an amount of acetylcholine below the required threshold or to a disturbance and abnormal production of esterase. Prostigmin, then, either protects the acetylcholine or inhibits the excess production of esterase.

Dr Otto Kraymer brought up the question of similarity between myasthenia gravis and curare poisoning and over dosage with the magnesium ion. In reply to Dr Kraymer's question about dosage of Prostigmin, Dr Viets stated that he found the minimum effective intramuscular dose to be 4.5 mg, and 120 mg by mouth. The difference in the amounts in the two forms of administration is unexplained.

The third paper was presented by Dr Tracy B. Mallory, "The Development of Emphysema in Chronic Bronchial Asthma." Dr Mallory said that it was first necessary to define emphysema, since clinicians and pathologists have

always differed. He classified emphysema into three types. The first or earliest he called "physiologic emphysema," occurring under exertion, or in asthma during attacks only. The next stage type was "functional emphysema," which is permanent and physiologic. The third was "structural emphysema," characterized by actual anatomic changes in the lung parenchyma: fusion of air sacs, rupture of alveolar walls and diminution of the respiratory surface area.

Dr Mallory analyzed 45 cases that had come to autopsy. Many of these patients had had asthma without emphysema. There were 13 cases demonstrating active organizing pneumonia or the resultant scarification. Thus, patches of lung were contracted to scars and the surrounding alveoli were dilated so that actual lung volume was unchanged. The more severe the process the more likely it is for bullae to develop as alveolar walls break. The primary causes of death in the group of 45 cases included 12 of pneumonia, 13 of paroxysmal attack, 4 of right heart failure and 2 of pulmonary insufficiency. There were 12 cases of asthma with cor pulmonale, but of these only a few had histologic emphysema. Thirteen cases of the 45 had structural emphysema.

Dr Mallory summarized his observations as follows: the relation of emphysema to asthma is overemphasized, but the relation of cor pulmonale to asthma is underrated, the development of emphysema depends more on the pneumonias than it does on pure asthmatic attacks.

The last paper, "Studies of Plasma Volume," was read by Dr Edward Hamlin, Jr. Dr Hamlin limited his discussion to the effect of adrenalin, Nembutal and sympathectomy on plasma volume in the cat. Plasma volume determinations were based on dilution values of a dye. After the initial determination, adrenalin (1:1000) was given intravenously in a dose three times the amount sufficient for minimal afferent stimulation. In the first experiment 8 out of 10 unanesthetized cats showed a 5 per cent increase in plasma volume. On repetition, all 10 showed an increase. This corroborates the results obtained by other investigators, but is of greater value because an anesthetic effect did not enter into the picture. In an attempt to evaluate the anesthetic factor, an experiment was carried out with Nembutal, 0.5 cc. per kilogram given to each of 6 cats. These showed an immediate increase in plasma volume of 10 per cent, following adrenalin there was a relative decrease—relative in the sense that it never reached the value of the initial reading in a non-anesthetized cat.

Sympathectomy gave variable increases in plasma volume. In sympathectomized cats, Nembutal produced a slight increase, and adrenalin then effected a marked decrease. Explanation of the phenomena is difficult, the effects are probably due to the action of adrenalin on the spleen and that of the barbiturate on vasodilatation, the mechanism of the plasma volume shifts being referable to the capillaries and venules.

#### TRUDEAU SOCIETY

A meeting of the Trudeau Society was held Thursday evening, February 2, in the Beth Israel Hospital auditorium, Dr Leon A. Alley presiding. Dr Alley introduced the speaker of the evening, Dr Edgar Mayer, assistant professor of medicine, Cornell University Medical College, whose subject was Diet in the Treatment of Tuberculosis.

Dr Mayer limited his remarks to a consideration of the particular dietary treatment practiced in certain clinics in Vienna and Munich. He had been sent to these clinics

with Dr Muller on a special commission to study the dietary regimen used in 1928 and thereafter

Based on the observation that an acid, ash residue diet promotes better and more rapid healing of wounds than does a neutral or alkaline one, Sauerbruch and Hermannsdorfer attempted to apply these principles to the treatment of tuberculosis. Gerson entered on this investigation and modified the method. The essence of the diet is low salt and high vitamin content. Special equilibrated salts of calcium, magnesium and potassium are given instead of sodium chloride. Fluids are restricted, and cod liver oil given in large amounts. This diet has the drawback of being very tasteless and difficult to institute.

Gerson's method is to restrict protein intake at first and then gradually give more. His essential is a vegetable basis—raw, boiled, steamed, extracted vegetables and an abundance of fruit and vegetable juices. A Hermannsdorfer diet for a 50-kilo man might consist of the following: 90 gm. of protein, 160 gm. of fat and 240 gm. of carbohydrate (40 to 50 calories per kilo of body weight). In addition the patient is given 40 gm. of cod liver oil, and the fluid intake is restricted to 1500 cc. daily. Salt is restricted to 2 or 3 gm. daily, the normal ingestion being about 15 gm. With the equilibrated salt, one must give hydrochloric acid. Meat and eggwhite are restricted.

In 1926, Sauerbruch first published a report of such treatment in pulmonary tuberculosis, but an analysis of this report reveals no suitable controls. In 1928 the series had been increased to 168 tuberculous patients by Hermannsdorfer and Sauerbruch, who reported glowing results. These results did not seem to be corroborated by other workers. In 1930 Dr Mayer tried the treatment at Saranac and was not particularly impressed. In 1932 Hermannsdorfer reported the results on 34 patients, 22 treated and 12 controls. Apparently no profound effect of the diet was demonstrable. Hermannsdorfer claimed that he got no great effect in the exudative type of pulmonary tuberculosis, in the productive type, however, he claimed to have lowered the temperature and to have decreased the amount of sputum. In 1935 further reports were also not convincing on account of poor controls. In summary the dietary treatment of pulmonary tuberculosis seems to have had very rare dramatic results but has not been consistently of benefit. Perhaps a fair trial has not yet been given, certainly not in this country.

In tuberculosis of the bones and joints and in genitourinary tuberculosis the results have been more consistent, although again the controls are not sufficient. Gerson included in his dietary regimen certain 'thrust days, meaning days in which nothing but raw fruits and vegetables and their juices were eaten. This essentially is a high potassium intake. Gerson claims to have obtained marked improvement in his cases, a single significant piece of evidence is that whereas ordinarily a tuberculous joint becomes quite reddened, painful and swollen if massaged, after a thrust period the joint may be so treated with impunity.

Dr Mayer described a few of his own cases in which as a last resort he tried the Gerson diet and apparently got remarkable results. However, he again concluded conservatively that the very few cases with dramatic results do not constitute an average that allows recommendation of the diet treatment *per se*.

Tuberculosis of the skin and mucous membranes presents some interesting features. It had been shown previously by German investigators that after a period of a salt free diet, the daily ingestion of 20 gm. of sodium chloride produced without exception an excessive out break of skin lesions in several types of skin disease, tuberculous and otherwise. This effect proved to be due to

the sodium and not the chloride ion. It was hypothesized that the sodium ion makes the cell membrane more permeable, and hence the cell becomes reactant to stimuli which ordinarily are not effective. From 1928 to 1932, a series of 600 cases of tuberculosis of the skin so treated was reported, with beneficial results. This work has been confirmed. Tuberculosis of the mucous membranes was said to heal in six or eight weeks, lupus-vulgaris nodules began to disappear in from six to ten weeks. One clinic reported 33 cases of lupus vulgaris treated with the Hermannsdorfer diet, including equilibrated calcium, magnesium and potassium salts. By microscopic photography of the capillary and subcapillary plexuses it was shown that the capillaries narrowed and the circulation improved. Identical changes occurred in cases of x ray dermatitis so treated, unless the lesion had gone on beyond telangiectasia to malignancy.

Dr Mayer concluded that there is a relation between water economy and reduced intake of salt. Tissue imbibition promotes an inflammatory reaction, therefore dehydration has the opposite effect. Vitamin-rich foods are a defense against the progress of infection. The effect of high intake of the cations antagonistic to the sodium ion is as yet still in doubt. Clinically, the effect of the Hermannsdorfer and Gerson diets is also still in doubt. Although a few patients with pulmonary tuberculosis have shown favorable results, the beneficial effect is common in tuberculosis of the bones, joints and genitourinary system and commonest in tuberculosis of the skin. The treatment is expensive and very difficult to administer. He added that there is no specific dietary treatment for tuberculosis but that certain diets will nonspecifically aid by producing beneficial vascular, chemical and cell permeability changes.

Dr Leon A. Alley opened the discussion of Dr Mayer's paper. He described an experiment carried out at Lakeville in conjunction with the Forsyth Dental Clinic which proved fairly conclusively that, in patients with extrapulmonary tuberculosis, a high vitamin-C diet decreased the incidence of carious teeth and also promoted an improvement in affected bones and joints.

Dr Mayer answered several questions as to details of his talk by members of the audience. The one significant point brought out was that he offered the Hermannsdorfer or Gerson dietary treatment to his patients only when other accepted measures had failed or could not be carried out. He made a plea for an open mind on this subject.

#### GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society was held in the auditorium of the Beth Israel Hospital on March 7, with Dr Louis M. Freedman presiding. Dr Maxwell Finland, associate in medicine, Harvard Medical School, and assistant physician, Thorndike Memorial Laboratory, Boston City Hospital, was the speaker of the evening, and his subject was 'The Present Status of the Specific Treatment of Pneumococcal Pneumonia and Other Pneumococcal Infections.'

The speaker retraced the rapid strides in treatment brought about in the past ten years, and particularly in the past two or three years. As long ago as 1910, typing of the pneumococcus was carried out, and three fundamentals of therapy in this disease, which still obtain, were postulated at that time—namely, that the antiserum must be type specific, must give a high titer of antibody and must be given early in the course of the disease.

The important advances in the specific therapy of pneumococcal infections since that time have been the stand

neutron source. The course of such a radioactivated compound after injection can be traced in its distribution to the various tissues in the body. The experiment consisted of injecting radioactive iodine compounds into rabbits, which had been treated previously with anterior pituitary extract to render the thyroid gland hyperplastic. Fifteen minutes later the rabbits were killed and the various tissues tested with the Geiger counter.

It was found that the thyroid gland contained 38 arbitrary units, whereas the spleen contained only 2, the liver 4, the pituitary gland 0, muscle 0, and the urine 48 (due to the excretion of the iodide). Dr. Hertz presented a chart showing the rate of absorption by various types of thyroid gland. The markedly hyperplastic gland is much more able to attract the iodine than is the normal thyroid. After the first fifteen or twenty minutes only a small amount of iodide is further attracted. Dr. Hertz suggested that this might prove to have applications of distinct value in estimating thyroid disorders.

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Dr. Mayer limited his remarks to a consideration of the particular dietary treatment practiced in certain clinics in Vienna and Munich. He had been sent to these clinics

Before the importance of the higher types in the etiology of atypical pneumonias was determined, the specific treatment of pneumococcal infections in children seemed futile, in the face of the remarkably low mortality of lobar pneumonia due to the types common to adults. But, although the replacement of an anatomical classification by an etiologic one has clarified the important place of the higher types of pneumonia in children, Dr. Curnen emphasized the fact that specific treatment is no substitute for good basic supportive handling of young patients. Nevertheless, serum has been tried with gratifying results for the past two years at the Children's Hospital, and the evidence indicates that the course is shortened and the complications decreased. The ease of administration and the fact that mixed infections are favorably treated make chemotherapy a popular form of therapy in serious cases, but statistics are still inconclusive, although they seem to indicate beneficial results.

Dr. William Dameshek reported amazing results in 50 per cent of cases of pneumonia treated with sulfa-pyridine at the Beth Israel Hospital. Indications for its use are a non typable pneumonia, a type in which specific serum is not available or of equivocal value, a very ill patient, and atypical cases where the typing is questionable. Contraindications include nephritis and a falling white-blood-cell count.

## NOTICES

### REMOVALS

HAROLD BOWDITCH, M.D., announces the removal of his office to 44 Harvard Avenue, Brookline. Telephone LONGwood 4995

WILLIAM M. SANTORO, M.D., announces the removal of his office to 1586 Beacon Street, Brookline. Telephone LONGwood 2060

### GREATER BOSTON MEDICAL SOCIETY

The annual dinner meeting of the Greater Boston Medical Society will be held at the University Club, Boston, on Monday, May 22, at 6:30 p. m. Judge Abraham E. Pinanski, of the Superior Court of Massachusetts, will be the speaker.

LOUIS M. FREEDMAN, M.D., *President*  
DAVID B. STEARNS, M.D., *Secretary*

### TRUDEAU SOCIETY

The annual meeting of the Trudeau Society will be held at the Plymouth County Sanatorium, on Thursday, May 25 at 4:00 p. m. Dr. Benjamin Grushkin of Temple University, Philadelphia, will speak on "The Intracutaneous Method for the Determination of Activity in Cases of Pulmonary Tuberculosis." Dr. Lauren V. Ackerman, of Rutland State Sanatorium, will report on a case of chronic cor pulmonale with unusual pathological findings.

There will be election of officers.

MOSES J. STONE, M.D., *Secretary*

### NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The annual meeting of the New England Society of Physical Medicine will be held on Wednesday evening, May 24, at the Hotel Kenmore, Boston.

The Council will meet at 6:00, and an informal dinner will be held in the Empire Room at 6:30. The program will begin at 7:45.

#### PROGRAM

Investigation of Certain Problems in Relation to Tissue Heating. Dr. Michael Pi Joan. 1

Dangers and Complications. Dr. Herman A. Osgood.  
Short Wave Therapy in Arthritis and Bursitis. Dr. Heinrich G. Brugsch.

Clinical Evaluation of Short-Wave Therapy. Dr. William D. McFee.

All members of the medical profession are cordially invited to attend.

WILLIAM D. McFEE, M.D., *Secretary*

### FOURTH ANNUAL CONVENTION OF THE NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The fourth annual convention of the National Gastroenterological Association will be held at Squibb Hall, Squibb Building, 745 Fifth Avenue, New York City, on June 1 and 2. A very interesting program is assured.

Members of the medical profession are cordially invited to attend.

HENRY KENDALL, M.D., *Chairman*  
Program Committee.

### AMERICAN CONGRESS OF PHYSICAL THERAPY

The eighteenth annual scientific and clinical session of the American Congress of Physical Therapy will be held on September 5, 6, 7 and 8 at the Hotel Pennsylvania, New York City. Preceding these sessions the Congress will conduct an intensive instruction seminar in physical therapy for physicians and technicians—August 30 and 31 and September 1 and 2.

For information concerning the seminar and the preliminary program of the convention proper, address the American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago.

### SOCIETY MEETINGS AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MAY 22

MONDAY MAY 22  
6:30 p. m. Greater Boston Medical Society. University Club Boston

TUESDAY MAY 23  
9:10 a. m. Hemoglobin. Iren Bilirubin. Dr. George Barkan. Joseph H. Pratt Diagnostic Hospital  
10 a. m. 12:30 p. m. Tumor clinic. Boston Dispensary

WEDNESDAY MAY 24  
9:10 a. m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital  
12 m. Clinicopathological conference. Children's Hospital amphitheater  
7:45 p. m. New England Society of Physical Medicine. Hotel Kenmore Boston.

ardization of antisera by exact methods, the concentration of sera so that a similar number of antibodies are available in a small volume, the subdivision of Group IV pneumonias and the manufacture of specific sera for some of these higher types, the introduction of therapeutic rabbit serum, in which a higher titer can be obtained in a shorter time than it can in horse serum, and finally chemotherapy, which, while still in its incipency, appears at least promising.

Dr Finland presented the results obtained at the Boston City Hospital by all methods of treatment in the pneumonia cases admitted during the ten year period 1929-1938. It was emphasized that these statistics were complicated not only by the ever-prevalent difficulty in controlling biological experiments, but also by the inadequate amounts of serum available in the earlier years when only the very sick patients were given specific therapy. In regard to etiology, it was pointed out that 80 per cent of all cases of lobar pneumonia in adults are due to Types 1, 2, 3, 5, 7 and 8, with the first three accounting for almost 60 per cent of the whole. On the other hand, although Types 1, 2 and 5 produce lobar pneumonia predominately, the others more often produce atypical pneumonias and focal infections, particularly Type 3.

There are certain generalities which hold for the treatment of pneumococcal infections of whatever type. Thus, bacteremia increases the mortality rate with or without treatment, although the small number of positive blood cultures in the specifically treated patients probably indicates an abortion or prevention of some such cases. The differences in bacteremic and in non-bacteremic mortality rates, however, vary somewhat among the types. A further factor common to all is the efficacy of early treatment, particularly before the fourth day. Moreover, in all types of pneumonia for which there is a specific serum, there has been some reduction in the mortality under treatment. In all these respects there is a quantitative difference in the various types.

The reduction in mortality by the use of specific horse serum varies from 75 per cent in Type 5 to practically nil in Type 3, although all the common types except the latter show at least a 50 per cent drop of the death rate. The apparent failure of Type 3 serum is explained by the paucity of available material and the necessity of saving it for the very sick patients. Rabbit serum finds its greatest use in Types 2 and 7, where the level of antibody titer often reaches five or six times that of horse serum. Although there seems to be no striking reduction in the incidence of empyema following the use of specific therapy, this may be explained by the fact that those who now live to develop this condition would have died without specific treatment, for more patients with pneumonia now avoid a fatal issue.

Untoward reactions from serum therapy occurred in higher percentage in this series of cases than in comparable groups using commercial products, for many of these incidents took place with sera that were being clinically tested before being released for general consumption. This line of reasoning also holds for the high incidence of reactions following the early use of rabbit serum, which was at least as high as that with horse sera. Indeed, the only severe reactions—that is, collapse—occurred in early experimental work. The common manifestations include nausea, vomiting, urticaria, collapse, chills and joint pains. The usual precautions should be taken: a careful allergic history, slow administration of the serum, and constant vigilance during the initial stages of the injection. Administration should be immediately discon-

tinued on noticing any untoward signs, and adrenalin should be used in severe reactions, if necessary.

The common causes of failure in specific serum therapy are delayed treatment, occasionally due to a misjudgment of the duration of the disease, errors in typing, inadequate or spread dosage, focal purulent infections mixed infections, especially with a streptococcus, and other complicating conditions or diseases, such as pregnancy, nephritis, congestive failure, and so forth.

Dr Finland went on to discuss the intriguing subject of chemotherapy, but without benefit of conclusive statistics as presented for serum therapy. This discussion was based on the use of sulfanilamide during 1937-1938 in a large series at the Boston City Hospital and observations during the present winter on sulfapyridine. The bacteriostatic action of these drugs *in vitro* has been proved satisfactory with many pneumococci but is not so striking as it is against the streptococci. And although the range of effectiveness is still debatable, the speaker said that sulfanilamide has exhibited its lifesaving qualities on several occasions. The most promising results have been obtained in Type 3 pneumonias, where sulfapyridine particularly has been extolled. Many preliminary reports on its use compare favorably with results from serum treatment, but none of these have emanated from a clinic where an adequate base line of results with and without serum has been established. Dr Finland recently reported a group of Type 3 patients treated with serum or sulfanilamide or both and found the results almost identical and seemingly not very striking. However, only the seriously sick patients received sulfanilamide, and since their mortality was at least as low as that of those otherwise treated, some benefit must have resulted from the chemotherapy. These results, together with other clinical reports and *in vitro* experiments, seem to indicate that in certain instances the optimum results are obtained from a combination of chemotherapy and specific serum therapy. One definite advantage of the addition of these bacteriostatic substances to the regimen is the opportunity it affords of discontinuing serum therapy, with its concomitant dangers, somewhat earlier than heretofore. Untoward reactions are not unheard of with these chemicals, however. Those encountered so far include hemolytic anemia, granulocytopenia, nausea and vomiting, nitrogen retention and certain symptoms of the central nervous system, such as profound depression and wild delirium.

In conclusion, Dr Finland stated that specific serum therapy has established its worth, with the possibility of rabbit serum, when available, replacing horse serum, due to its greater efficacy per unit volume and greater ease in preparation. The use of sulfanilamide and sulfapyridine, either alone or in combination with serum, appears to offer a powerful means of therapy, but there have not as yet been a sufficient number of controlled studies to substantiate all the rosy claims.

In discussion, Dr Frederick T. Lord emphasized certain features of the treatment of pneumonia in private practice, especially in regard to serum therapy. Blood culture when the patient is first seen may afford an early and sometimes the only means of typing, besides partly determining the dosage of serum to be given. He finds that, on the whole, too small dosage is given, the administration is too slow, and there is a failure to adjust the dosage to the requirements of the individual case. The nominal amount should be doubled when there is a positive blood culture, when the temperature fails to drop and when there is clinical evidence of a spreading lesion.

Dr Edward Curnen, of the Children's Hospital, discussed certain differences in the pneumonias of children.



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## BIOPSY OF THE UTERINE CERVIX\*

### The End Results of One Hundred Consecutive Interventions

LOUIS E. PHANEUF, M.D.,† AND MAURICE O. BELSON, M.D.‡

BOSTON

IN THE present state of our knowledge the best results in the management of carcinoma in any part of the human body are obtained through early diagnosis and early application of the best treatment known. This applies emphatically to the uterine cervix, which is readily accessible to palpation and visualization. There are no symptoms in early cancer of the cervix, and this accounts for the fact that the diagnosis in many cases is not made until the disease is well established. The symptoms of the non-malignant diseases of the portio bring a number of patients to the physician. Again, the irritative lesions of this organ, such as lacerations, ectropion, erosion, chronic cervicitis and endocervicitis, are discovered during the course of a periodic health examination. We are beginning to realize that the so-called cancer age is a misnomer, as this disorder may occur at any age. Be that as it may, all clinicians of wide experience know for a certainty that cancer of the cervix is found most frequently in the fourth decade of life. The ideal would be the periodic examination of all women who have reached this age, bearing in mind that the disease, while most commonly found in those who have been subjected to the trauma of labor, may exist in nulliparous and virginal women.

At the Boston Dispensary we see a large number of cervixes, showing a varying amount of irritation, some coincidental with the trauma of childbirth, others as the result of inflammatory disease. Five years ago the Department of Gynecology adopted the policy of making one of us (L. E. P.) responsible for the diagnosis and disposition of all pelvic carcinomas. With this end in view, a special

clinic was established to which all such patients, including those with pathologic cervixes, are referred. It is usually impossible to differentiate, with the naked eye, severe chronic cervicitis and early carcinoma. Since the true diagnosis of carcinoma can be established only by the microscope, it is obvious that a biopsy specimen must be obtained. The Schiller test and the colposcope are helpful in selecting the area from which the biopsy should be taken, but they accomplish no more.

The taking of a cervical biopsy is a simple procedure. The area having been selected, the specimen may be excised with a sharp knife, the No. 11 Bard-Parker blade being excellent for this purpose. The base of the incised area is cauterized with *crude carbolic acid*, a 15 per cent solution of iodine or a cautery, if one is available, this is done in order to seal the lymphatics and prevent metastases if carcinoma is present. In a clinic where a large number of biopsies of the cervix are taken, there are advantages in using the electrically charged wire loop of the high-frequency apparatus, since this seals the lymphatics as the tissues are cut through. The charring is not sufficient to interfere with a satisfactory histological examination. The commoner lesions of the cervix, such as simple erosions and small lacerations, are treated by linear cauterization with a fine tip cautery. From the more severe lesions most of the tissue under the ectropion or erosion is removed from both the anterior and posterior lips. This procedure serves two purposes: on the one hand it permits a histological diagnosis, and on the other is responsible, in the absence of carcinoma, for healing the organ. In chronic cervicitis treated by this procedure, the cervix is usually completely healed and covered with healthy squamous epithelium in the course of six or at the most eight weeks. In rare cases severe areas may have to be subsequently cauterized. If the diagnosis of carcinoma is established, treatment in the form

\*From the Gynecological Department of the Boston Dispensary, a unit of the New England Medical Center. Read at the annual meeting of the New England Obstetrical and Gynecological Society, Boston, December 7, 1938.

†Gynecologist and obstetrician-in-chief, Carney Hospital, professor of gynecology, Tufts College Medical School.

‡Instructor in gynecology, Tufts College Medical School, assistant surgeon, Department of Gynecology, Boston Dispensary.

THURSDAY MAY 25

9 10 a m Rheumatism Presentation of cases Dr Walter Bauer  
Joseph H Pratt Diagnostic Hospital

FRIDAY MAY 26

\*9 10 a m Recent Advances in the Understanding of Gastric Secretion  
Experimental and clinical observations Dr Oliver Cope Joseph H  
Pratt Diagnostic Hospital

\*10 a m 12 30 p m Tumor clinic Boston Dispensary  
12 m Clinical meeting of the Children's Medical Service Massachu-  
setts General Hospital Ether Dome

\*9 p m Massachusetts Italian Medical Society Hotel Kenmore Bos-  
ton

SATURDAY MAY 27

\*9 10 a m Hospital case presentation Dr S J Thannhauser  
Joseph H Pratt Diagnostic Hospital

\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital  
Conducted by Dr Henry A Christian

\*Open to the medical profession

lished by the Harvey Cushing Society The compiler and  
the printer have worked together to produce a book of  
exceptional value.

*The Extra Pharmacopoeia* Martindale Twenty-first edi-  
tion Vol 2 1148 pp London The Pharmaceutical  
Press, 1938 22s 6d.

When the production of a book extends through twenty-  
one editions it is fair to assume that there is approval of  
its quality to interest and instruct its readers. In this pub-  
lication, the Council of the Pharmaceutical Society of  
Great Britain presents the advances made in pharmacology  
and the ancillary subjects of medical knowledge.

Beginning with an analytical addendum to the list of  
chemicals and the materia medica set forth in Volume I  
of this edition, there will be found in subsequent sections  
of this volume a list of the proprietary medicines sold in  
Great Britain with the composition of each, so far as ascer-  
tained, following are chapters on reagents and analyses  
of body fluids, nutrition and vitamins, chemical sub-  
stances used in therapeutics, and bacteriological and clinical  
notes in explanation of an extensive list of diseases,  
with the preventive and therapeutic principles applicable  
to each

The wide range of subjects dealt with requires an ex-  
tensive, carefully and concisely phrased text which con-  
veys useful up-to-date information, for physicians and  
students, relating to the preservation of health and the  
alleviation of human suffering

*Dunant The story of the Red Cross* Martin Gumpert  
323 pp New York Oxford University Press, 1938.  
\$2.50

This is a well written book concerning a strange and  
interesting man. It is more than a biography for the  
author not only gives the facts of Dunant's life but also  
records the history of Europe from 1850 to 1910, the year  
of Dunant's death. After the battle of Solferino in 1859,  
where Dunant first visualized the need for a Red Cross  
in war, one travels with this extraordinary man from  
country to country, watching the growth of the Red Cross  
idea on the background of European political, martial  
and economic upheavals The author has done his  
work well, and the book gives a splendid picture of the  
man and his times Dunant's career as one of the most  
distinguished men of his day, the Nobel prize of 1901,  
his loss of friends and final poverty, and his tragic end in  
1910, are all clearly told The text appears to be well  
translated from the German.

## BOOK REVIEWS

*A Bibliography of the Writings of Harvey Cushing Pre-  
pared on the occasion of his seventieth birthday  
April 8 1939 The Harvey Cushing Society 108 pp  
Springfield, Illinois Charles C Thomas, 1939 \$5.00*

This beautifully printed book, complete in every sense,  
is a welcome addition to medical literature and a fitting  
*Festschrift* for one of America's greatest surgeons. It con-  
tains the facts of his life, his degrees, a list of each mono-  
graph and paper by him, as well as those coming from his  
clinic, and a list of his associates. There are six hundred  
and fifty-eight items in all, cited with care and augmented  
with additional notes, giving unusual facts about the ar-  
ticles The book is worthy of the man. There is an ap-  
propriate introduction by Arnold C Klebs A limited  
edition, with special typographical features, has been pub-

*Allergic Diseases Their diagnosis and treatment* Ray M  
Balyeat and Ralph Bowen. Fifth edition. 547 pp  
Philadelphia F A. Davis Co, 1938 \$6.00

A clear conception of allergic manifestations has been a  
much needed chapter in medical knowledge of today  
This need has been met by a perfectly clear, lucid and  
comprehensive text written by Dr Balyeat. The matter  
is comprehensively and systematically organized and pre-  
sents the allergic manifestations of almost every known  
substance. It also explains the errors in the reactions and  
proposes the need of a conservative judgment on the part  
of the physician The plates reproduced in the text,  
however, are particularly poor, being dark and with little  
detail. In spite of this, the book must be highly recom-  
mended to every internist who needs a handbook and text  
for reference to the problem of allergy

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## BIOPSY OF THE UTERINE CERVIX\* The End Results of One Hundred Consecutive Interventions LOUIS E. PHANEUF, M.D.,† AND MAURICE O. BELSON, M.D.‡ BOSTON

IN THE present state of our knowledge the best results in the management of carcinoma in any part of the human body are obtained through early diagnosis and early application of the best treatment known. This applies emphatically to the uterine cervix, which is readily accessible to palpation and visualization. There are no symptoms in early cancer of the cervix, and this accounts for the fact that the diagnosis is well established. The symptoms of the non-malignant diseases of the portio bring a number of patients to the physician. Again, the irritative lesions of this organ, such as lacerations, ectropion, erosion, chronic cervicitis and endocervicitis, are discovered during the course of a periodic health examination. We are beginning to realize that the so-called cancer age is a misnomer, as this disorder may occur at any age. Be that as it may, all clinicians of wide experience know for a certainty that cancer of the cervix is found most frequently in the fourth decade of life. The ideal would be the periodic examination of all women who have reached this age, bearing in mind that the disease, while most commonly found in those who have been subjected to the trauma of labor, may exist in nulliparous and virginal women.

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The taking of a cervical biopsy is a simple procedure. The area having been selected, the speculum may be excised with a sharp knife, the No. 11 Bard-Parker blade being excellent for this purpose. The base of the incised area is cauterized with crude carbolic acid, a 15 per cent solution of iodine or a cautery, if one is available, this is done in order to seal the lymphatics and prevent metastases if carcinoma is present. In a clinic where a large number of biopsies of the cervix are taken, there are advantages in using the electrically charged wire loop of the high-frequency apparatus, since this seals the lymphatics as the tissues are cut through. The charring is not sufficient to interfere with a satisfactory histological examination. The commoner lesions of the cervix, such as simple erosions and small lacerations, are treated by linear cauterization with a fine-tip cautery. From the more severe lesions most of the tissue under the ectropion or erosion is removed from both the anterior and posterior lips. This procedure serves two purposes: on the one hand it permits a histological diagnosis, and on the other it is responsible, in the absence of carcinoma, for healing the organ. In chronic cervicitis treated by this procedure, the cervix is usually completely healed and covered with healthy squamous epithelium in the course of six or at the most eight weeks. In rare cases severe areas may have to be subsequently cauterized. If the diagnosis of carcinoma is established, treatment in the form

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†Physician in chief and obstetrician-in-charge, Carney Hospital, professor of gynecology, Tufts College Medical School.

‡Instructor in gynecology, Tufts College Medical School, assistant surgeon, Department of Gynecology, Boston Dispensary.

of irradiation by means of radium and high-voltage x-ray therapy is immediately applied. A cancer which is so early that it cannot be detected with the naked eye shows good results under this form of therapy. Women with deeply lacerated cervixes who have no evidence of carcinoma on microscopic examination are referred to hospitals for plastic repair or amputation.

This study represents the findings of an analysis of 100 patients treated at the New England Medical Center from September, 1934, to September, 1938, in whom the results of the clinical examination of the cervix were such that biopsy was performed.

The ages of the patients varied from twenty-one to seventy-five. Tabulating the series according to ages in ten-year groups, we found 8 per cent from twenty-one to thirty years, inclusive, 34 per cent from thirty-one to forty, 32 per cent from forty-one to fifty, 16 per cent from fifty-one to sixty, 8 per cent from sixty-one to seventy and 2 per cent from seventy-one to seventy-five. Two thirds of the patients were in the third and fourth decades, the remaining third being distributed over the second, fifth, sixth and seventh.

In this group of 100 women 10 had borne no children, of these only 1 had had any miscarriages, and she had had three. The remaining 90 had each borne from one to twelve children. Forty-six patients, or almost half the total number, had borne either two or three children.

Sixty-nine, or more than two thirds, of the women had had no miscarriages. Of the remaining 31 patients, 14 had had one, 9 two, 5 three and 3 four.

Thirty-four women, a little over one third of the total, were beyond the menopause, of these, 32 had had a natural menopause and 2 a surgical one.

The blood Hinton test was negative in 84 patients, positive in 13, doubtful in 2 and not done in 1. Four of the 13 who had positive reactions also had carcinoma of the cervix. Syphilis and carcinoma may be present at the same time in the same person, and the fact that the patient has a positive Hinton test should not deter one from doing a biopsy of a suspicious lesion of the cervix.

The Schiller test was not done routinely in these cases. Of the 36 patients on whom the test was performed, the reaction was positive in 6, negative in 15, and suspicious in 15. The histological reports of the biopsy in the 6 positive cases indicated chronic cervicitis with erosion, of the 15 suspicious cases, 2 were carcinoma of the cervix and 13 were chronic cervicitis. On histological examination 1 case with a negative reaction proved to be carcinoma.

In this series only 3 women had had some oper-

ative procedure on the cervix previous to the biopsy. 2 had had cauterization of the cervix and 1 trachelorrhaphy.

The clinical diagnoses previous to biopsy were as follows: erosion of the cervix in 68 women, laceration with erosion of the cervix in 21, carcinoma of the cervix in 6, papilloma of the cervix in 1, cervical polyps in 2, carcinoma of the vagina in 2. The microscopic diagnoses are shown in Table 1. Some of the histological reports had

TABLE 1 *Histological Diagnoses*

DIAGNOSIS	NO. OF CASES
Chronic cervicitis	59
Chronic endocervicitis	25
Erosion of cervix	24
Nabothian cysts	5
Ulceration of cervix	1
Cervical polyp	1
Suggestion of malignancy	1
Carcinoma of cervix	5
Epidermoid carcinoma of cervix	2
Squamous-cell carcinoma of cervix	2
Metastasis to cervix (primary in body of uterus)	1
Adenocarcinoma of vagina (primary in body of uterus)	1
Undifferentiated carcinoma (Grade 4)	1
Glandular hyperplasia and metaplasia of surface epithelium	1
Leiomyosarcoma	1
Fibroma of cervix	1
Tuberculosis of cervix	1
Total	132

more than one diagnosis, which accounts for the discrepancy between the number of cases examined (100) and the number of diagnoses (132).

Eighty-two per cent of the patients had histological diagnoses of chronic cervicitis, chronic endocervicitis, erosion, nabothian cysts or ulceration or a combination of these, in 1 per cent the diagnosis was cervical polyp, and in another 1 per cent tuberculosis and in still another 1 per cent, fibroma of the cervix. Ten per cent had a diagnosis of carcinoma of the cervix, and 1 per cent each, metaplasia of the surface epithelium, a suggestion of malignancy, metastasis to the cervix (primary in the body of the uterus), adenocarcinoma of the vagina (primary in the body of the uterus), and leiomyosarcoma. In other words, 85 per cent of these women had benign lesions.

The 10 patients in whom cervical carcinoma was discovered were treated by irradiation with radium and high-voltage x-rays. In all the cervix was healed. The longest time elapsing since treatment was instituted is about four years, so that more time must pass before we can speak in terms of cure or arrest. However, in none of these patients was there parametrial involvement at the start of the therapy, nor has there been any since. It seems fair to assume that a high percentage of these early cases will be cured, all are under observation at the present time.

#### SUMMARY AND CONCLUSIONS

In the state of our present knowledge the best results in the management of carcinoma of the

cervix must come from early diagnosis and early treatment.

The Schiller test and the colposcope are useful methods in pointing out the area from which a biopsy must be taken.

The diagnosis of carcinoma of the cervix can only be established with the microscope.

A biopsy specimen may be taken satisfactorily in ambulatory patients with a sharp knife or the electrically charged wire loop of the high-frequency apparatus. If the former is used, the base of the incised area must be cauterized in order to seal the lymphatics. Usually no anesthesia is required.

Only a biopsy and histological study will settle the diagnosis between severe cervicitis and early carcinoma.

When cancer is not present, removal of the tissue under irritation for a biopsy specimen causes the cervix to heal.

In a series of 100 consecutive biopsies in severely irritated cervixes, primary carcinoma was reported in 10 per cent.

All patients with early cancer of the cervix were treated by means of radium and high-voltage x-rays. In all, the cervixes are healed, and the patients are under observation at the present time.

## GROUP HOSPITALIZATION\*

REGINALD F. CAHALANE†

BOSTON

IN THE midst of all the discussions of the political, social and economic trends of the American way of living, there still dominates in the average, self-supporting individual a desire to plan for meeting his bills, as is evidenced by the rapid growth of membership in hospital service plans. The co-operative movement of the hospitals has enabled this section of the public to budget the low cost of medical protection, and they have thus come to realize the value of this non-profit service. The small cost alone does not necessarily attract public interest. The rapidly increasing popularity of group hospitalization is due to actual performance of the services rendered. This movement is meeting the challenge of a changing economic order by rendering services within the means of the average person, yet on a normal economic basis.

Non-profit hospital protection is motivated by a desire to alleviate the financial burden of unanticipated hospitalization—not with the implication that hospital bills are too high, but because illness or accident may require hospital care at a time when the cost is burdensome.

Plans for hospital care become possible through the co-ordination of three interests—the subscriber, who pools his subscription with fellow-subscribers, the plan, which serves as trustee for these funds, and the hospital, which renders the service. Accordingly the movement is a combination of insurance and public welfare. Its fundamental principle is simplicity of procedure in striving to serve the average person by rendering *all inclusive* hos-

pital services. Such benefits to the subscriber-patient become easily understood as the hospital promptly and efficiently renders these services and the service plan quickly relieves the patient of financial worry through assurance of his ability to pay. The subscriber-patient is served because he has provided for the contingency. Furthermore, the hospital is relieved of the problem of installment collection. It is predicted by the American Hospital Association that there will be two hundred plans and ten million subscribers within the next five years. I believe this prediction will prove to have been most conservative when a full realization of embryonic plans comes to pass.

The primary purpose of group hospitalization is that of public service, and the subject should not be attacked solely from the point of view of benefit to hospitals or the medical profession. While it is recognized that problems of hospital finance originate in the inability of a great many patients to pay the cost of care,—and the same is true of doctors' bills,—any measure to overcome financial difficulties which does not attack the root of the problem falls far short of a satisfactory solution. The only method thus far devised which partially solves this fundamental problem is group hospitalization.

While group hospitalization plans have been in operation for a number of years, the newer ones are still in the early stages of development and the older ones, through their experience, are better able to progress. The rapid advance which is being made can be interpreted as a marked contribution to the welfare of any community enjoying the advantages of group hospitalization. Its public benefits may be far-reaching under proper

\*Presented at the annual meeting of the Vermont State Medical Society, Burlington, October 6, 1935.

†Executive Director, Associated Hospital Service Corporation of Massachusetts.

administration and control. Because its possibilities for good are great, there is considerable likelihood that it may become a source of danger, both to the relations of hospitals with the public and to the obvious advantages of voluntary and ethical control of hospital services. If it is permitted to develop along unethical or commercial lines, the public-service viewpoint may be obscured and become secondary to private or commercial interests. Consequently, the primary concern of group hospitalization as hospital service must be public service, with individual interests of hospitals as institutions secondary to that of the fundamental principle and policy of public benefits. The problem of presenting the benefits of the plan to this group cannot be solved until arrangements are made whereby medical service can be included on a basis which has the approval of the medical profession. This is a problem which the medical profession must solve and one which hospital service plans cannot conquer alone. Benefits as they exist today are of such scope as to embrace a part of the population which has heretofore been overlooked. Group hospitalization offers subscribers the means of maintaining their independence and self-respect, and at the same time enables hospitals to furnish needed services without incurring deficits. The result is improvement in public relations with and good will toward hospitals, the latter of which, while it cannot be measured in dollars and cents, is an asset of tremendous importance to the community and to hospitals generally.

No one will deny or belittle the benefits which have come to thousands of needy individuals and to member hospitals, but since the services rendered by a hospital in a community are in effect a public service, it appears that in communities where there is more than one hospital such hospitals should participate in a plan of this type in order that the public normally served by them may obtain benefits without restriction to a single institution, with all the complications and limitations involved therein. The administration and control of any plan should be vested in a body representing the community, there should be no domination either by hospitals or the medical profession, but both should be adequately represented.

The discerning student of the problem, and of the solution of it offered by group hospitalization, must come to the conclusion that a plan organized, established and operated on a non-profit basis, involving the participation and united action of its member hospitals, offers the best means of protection to hospitals against any unfavorable development of group hospitalization. The acceptance of this theory involves the whole-hearted co-operation

and support on the part of hospitals in the establishment and operation of such plans. Hospitals themselves have an important role to play in the sound administration and operation of any plan, and it is possible that the lack of such whole-hearted co-operation has encouraged the establishment of plans which do not embrace all the protective measures mentioned. There is need of adequate public safeguards against poor and inefficient administration, and such safeguards are undoubtedly found in proper and careful supervision by state departments of insurance, under laws which provide such supervision without burden some taxes or investments.

Every plan must necessarily have the interest and co-operation of the medical profession, and the future is to a large extent in its hands. The medical profession has been helpful, and where opposition has been apparent it has been caused usually by a lack of understanding or because of a conflict between certain members of the medical profession and the hospitals in which they practice. Let us assume that a hospital service plan is properly established on the basis of limiting its benefits to actual hospital service, and that the hospitals agree to render such service. There is no need for capital investment, because the facilities and equipment of member hospitals represent adequate assurance that benefits can and will be provided in accordance with the terms of the subscriber's agreement, and that the agreement will be observed by those in charge of the plan and the member hospitals. In other words, member hospitals themselves become the reserve of any voluntary hospital service plan. Voluntary hospitals are operated as community service organizations on the same basis as that on which hospital service plans should be operated. The only factor of public safeguard that remains necessary is that subscription rates, payments to hospitals and operating costs shall be established and properly maintained so as to ensure financial soundness without loss to any party concerned.

No hospital service plan should attempt to operate until it is able to meet the standards of organization as set forth by the American Hospital Association. This association has ruled that no organization can be approved and its members permitted to use the Blue Cross with the American Hospital Association seal superimposed thereon until it has had at least six months of successful experience. Approval by the association means a great deal to subscribers and to employers who make a plan available to their employees. There are now forty approved plans, and it is expected that this number will increase with the publishing of the next list.

Let us consider briefly some of the standards for non-profit hospital service plans. First, the corporate body should include adequate representation of hospitals, the medical profession and the general public, and board members should receive no remuneration for their services, second, no private investors should advance money in the capacity of stockholders or owners, initial working capital may best be provided by individuals, community chests, hospital councils or other civic agencies. It is my opinion that this money should not take the form of gifts but that of a non-interest-bearing loan, to be repaid out of earned income over and above operating expenses, payments to hospitals and legal reserve. The benefits of non-profit hospital care should be guaranteed through contracts with member hospitals, which assume the ultimate responsibility for providing service in accordance with contracts with subscribers. Benefits to subscribers should be guaranteed through service contracts with member hospitals, as opposed to cash indemnification contracts for hospital expenses. Of course it is necessary that arrangements be made for provision of service in non-member hospitals in case of serious illness or accident. Payments to hospitals should be based on the cost of services provided to subscriber-patients. It is readily understandable why employees of non-profit plans for hospital care should be reimbursed on a salary rather than commission basis. Promotion and administrative policies should be dignified in nature and consistent with the professional ideals of the hospitals concerned. The service provided should be on a par with the practices of the leading hospitals and the wishes of the attending medical staffs as concerns their respective communities. There should be no interference with the existing relations between physicians and patients. No hospital service plan operated for profit or on a commercial basis will be approved by the American Hospital Association.

If commercial companies can operate a hospital service plan which is better than voluntary hospital service plans, there is no reason for the existence of the latter and the public will be the gainer. A number of commercial companies—some fifty in all—have been or are attempting to match the benefits offered by voluntary hospital service plans. In the last six months a great many insurance companies have offered such contracts in the hope of riding the wave of popularity which has come to hospital service plans. Some of these firms frankly admit that the only purpose of their writing such a contract is to give their agents an opportunity to get their feet in the door and

perhaps make a sale of a more expensive and more profitable contract.

Let us now consider the nature and extent of such services as may be properly included under the hospital service plan. In doing so, let us remember that the benefits for subscribers are represented in hospital service and not in cash. In following the pattern and practices of hospitals in rendering service and exacting charges therefor, there is ample ground for the belief that a plan should include as benefits all the services which hospitals regularly provide and which are involved in their operating costs, and for which charges are established and collected.

Enrollment regulations vary with local conditions. Applications must be submitted in representative groups and no single applications are acceptable. Only employed persons who themselves enroll may submit applications for the dependent members of their families in their immediate households.

Let us now consider what happens when the number of hospital patients under a hospital service plan increases rapidly. The merit of the plan becomes better recognized throughout the community and the momentum of public interest and response increases. The limitations today are represented in the fact that benefits are confined to persons who can make the arrangements for the services of a personal physician. For persons in the group with very low income, financial inability to engage a physician nullifies in effect the benefits of this plan. Government will be urged to act for the low-income group. Social security is generally accepted as necessary, or at least we have become used to it.

We cannot overlook the fact that the medical profession has given freely of its time and services to take care of the medically indigent. If a plan is ever evolved to insure the low-income group for medical services, an extensive campaign of public education will be necessary. Much of the difficulty comes in getting those in the low-income group to seek medical care in time, to say nothing of getting them to go to a hospital when they should.

Since the National Health Conference was held in Washington in the summer of 1938, the American Medical Association through its House of Delegates has made a report which seems to justify the stand taken by the famous group of four hundred and thirty physicians. It now favors government assistance for private institutions. Utilization of hospitals has steadily increased and government funds may be needed for the expansion of hospital facilities and for maintenance if hospitals assume more responsibility for the care of

the indigent and medically indigent. The American Medical Association is strongly opposed to compulsory health insurance, but is unmistakably in favor of what is called socialization of medicine so long as the details of administration are handled locally. If any program to include medical care is to be evolved, it must be initiated carefully in order that all possible safeguards may be set up for eliminating political influence.

A recent editorial in the *New York Times* inquires

What of the many who cannot pay even reduced physicians' fees but can set aside regularly something for medical treatment? They must turn to the public hospitals or private charity. Yet the Association advocates more efficient use of existing hospital facilities in one breath, and in another illogically insists that hospitals should not provide medical care. Moreover, workmen's compensation is to be expected to include sickness benefits. Employers and employees must have nothing to do with salaried or contract medicine.

There is no question but that the public is waiting for a plan which will enlist voluntary agencies in coping with the problem of illness before taxation is invoked. It is important to the medical profession that more concessions be made in order that the country may be convinced that the need of taxation has been reduced to an irreducible minimum.

There is no single community in Vermont large enough to operate a plan of its own unless the work is done by volunteers, and there would be no great amount of earned income to be used in meeting the costs of administration and acquisition. It would be virtually impossible to operate a state wide plan on such a basis. The laws of Vermont are entirely inadequate for the operation of a non-profit hospital service plan, and legislation should be requested of the legislature at its next session.\* Such laws as exist in New York, Pennsylvania and Massachusetts might well be used as a pattern.

I believe it is advisable for the Vermont State Medical Society and the Vermont Hospital Association to consider seriously this problem of group hospitalization. Your people want it, as is evidenced by the tremendous number of inquiries received by those in charge of plans in New York and Massachusetts. These people will find a way to get it, through commercial contracts or by enrolling in non-profit plans by mail. We do not encourage this type of enrollment, but we shall make it available to those communities which are not served by an approved non-profit hospital service plan. It appears logical, then, to attack this problem promptly and determine a likely solution.

21 Milk Street.

\*Legislation in Vermont has recently been enacted.



## CLINICAL NOTE

## TESTOSTERONE PROPIONATE AS A THERAPEUTIC AGENT IN PATIENTS WITH ORGANIC DISEASE OF THE PERIPHERAL VESSELS\*

## Preliminary Report

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IN as serious a condition as vascular insufficiency of the extremities, any procedure which gives promise of being effective in treatment deserves early trial of its usefulness. In spite, therefore, of the small number of cases of arterial disease that we have treated with testosterone propionate we feel justified in making this preliminary report.

Our attention was directed to the general vascular effect of testosterone propionate while studying the skin changes in human male castrates. With the recording spectrophotometer,<sup>1</sup> we had noticed that the skin of these subjects showed a lack of arterial blood, although the more venous regions of the body contained an abnormally large amount of venous blood. After treatment with testosterone propionate there was an increase in arterialization and blood volume in those regions normally arterial, such as the head, palms of the hands and soles of the feet. Less constantly there was a diminution in volume of blood in the normally venous areas, such as the lower abdomen and the dorsum of the foot, attended by a shift in the contained blood to a more arterial type. These changes, as well as that in the other skin pigments, are receiving further study.

We have now treated 7 male patients having organic vascular disease with crystalline testosterone propionate. Three of the men presented typical signs of thromboangitis obliterans (Buerger's dis-

ease), the other 4 were arteriosclerotic. In all 7 patients the involvement was major, with loss of the popliteal, femoral and, in one case, the iliac pulsations. The absence of pulsation was checked by the Pachon oscillogram. The signs and symptoms were marked, including small ulcerations in 2 of the patients with Buerger's disease. The testosterone propionate, dissolved in peanut oil, has been given intramuscularly two or three times a week. Adjunctive treatment consisted only of general hygiene, except in the ulcer-free patient with Buerger's disease, to whom eight hours of suction-pressure treatment was given. None of the patients have been followed for more than several months, since treatment of the earliest case was started on July 23, 1938.

Each of these patients with vascular disease showed a lack of skin arterialization by spectrophotometry which involved not only the diseased limbs but also the entire body. The administration of testosterone propionate produced a marked change. As in the case of the castrates, the spectrophotometric curves after treatment showed an early and decided arterialization of the cutaneous blood. Moreover, the after-treatment curves likewise showed an inconstant diminution in the volume of blood in the more venous areas of the body.

Other objective evidence of favorable change was an increase in the systolic pressure of from 6 to 26 mm of mercury in the hypotensive members of this group, and a lowering of hypertensive blood pressures in 2 cases. The ulceration in 1 patient with Buerger's disease has healed, the second has greatly improved. There was marked improvement in the walking ability of all the patients, with delay or abolition of intermittent claudication. Two patients were no longer subject to night pain, which had troubled them previously. Subjectively, the patients reported an increased activity and a feeling of optimism, results similar to those reported previously with male-hormone treatment.<sup>2</sup>

We believe that this material deserves further trial in both organic and functional arterial disease in order to establish clearly its mode of action and to be sure of its harmlessness. It remains to be seen whether its effect will vary in patients with or without testicular deficiency. Moreover, its usefulness in women is so far undetermined and should be approached with caution.

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## REPORT ON MEDICAL PROGRESS

## OTOLARYNGOLOGY

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IN THE literature of otolaryngology, and in the general literature as well, there have appeared during the past year many articles on subjects within this field, of interest to both the specialist and the general practitioner. It is the purpose of this brief report, in which no comprehensive review of the literature has been made, to consider a few of these articles and to call attention to others.

## NOSE AND SINUSES

*Intranasal Medication*

In recent years workers<sup>1-3</sup> in the field of nasal physiology have demonstrated the importance of ciliary activity and the different effects of various drugs upon it. The drugs commonly used in the nose may be divided into antiseptics, astringents and vasoconstrictors in vehicles of oil, distilled water or physiologic salt solution. Oils, as vehicles, interfere with the normal streaming of mucus, and since they are not miscible with the mucus blanket covering the cilia, the drugs dissolved in them act less effectively. In addition, lipoid pneumonia, as a result of entrance of oil into the lung, is a distinct danger, as reports in the literature indicate.<sup>4,5</sup> While this is especially true in infants and children, the danger exists for adults as well. Tap water and distilled water have also been demonstrated to be harmful to ciliary activity. Isotonic saline is the least harmful of all the common vehicles used in the nose. Walsh and Cannon,<sup>6</sup> in order to demonstrate the effectiveness of some of the antiseptics used in the nose, mixed pus from the lung of a patient with bronchiectasis with equal parts of solutions of the following drugs: Neosilvol 5 and 10 per cent, argyrol 5 and 10 per cent, thymol 1 per cent, menthol 1 per cent and Isedrin Compound. These were allowed to stand at room temperature, and at intervals up to forty-four hours 0.1 cc. of each mixture was cultured and colony counts made. The only drug with any appreciable bactericidal effect was 1 per cent thymol, and this drug had a marked depressant effect on ciliary activity. Further studies were made on the changes produced in the lungs of normal rabbits following the instillation of oil and aqueous solutions of antiseptics, astringents and vasodilators. Oily solutions produced edema, desquamative alveolitis and focal lipoid pneumonia. When mixed with living bacteria cultured from the nose of a rabbit with the

snuffles, they caused, after two or three weeks, granulomatous lesions containing oil. Watery solutions of antiseptics and astringents entered the lungs and caused edema, focal necrosis, purulent bronchitis and bronchopneumonia. Isotonic saline solutions of the vasoconstrictors, ephedrine and Neosynephrine, caused no significant degree of pulmonary damage after intranasal instillation in normal rabbits.

It would seem from the evidence at hand that solutions of drugs in oil should never be used as intranasal medication in infants and children, and should be used with care in adults. Antiseptic solutions are of doubtful value in decreasing the pathogenic flora of the nose, and if the data obtained from animal experiments apply to human subjects as well, there is danger of producing severe lung lesions. Ephedrine is a chemically stable vasoconstrictor which in physiologic solution of sodium chloride does not produce the unpleasant sensations of stinging and burning. These qualifications render it especially suitable for use in children.

Parkinson<sup>7</sup> advocates the following procedure for relief of nasal obstruction in the common cold. The nose is sprayed with a 1 per cent isotonic solution of ephedrine. After five or ten minutes the patient lies on his side, using the shoulder as a fulcrum, with the head bent toward the low shoulder. The solution is then instilled into both nasal chambers and allowed to remain for three to five minutes, after which the head is rotated face down to permit the nasal contents to escape from the nostrils. This position is especially useful in treating children. An alternative position is that of Proetz, in which the patient lies on his back with the head well extended over the edge of a bed or table so that the medication reaches the region of the ostia of the sinuses and remains in contact long enough to be effective.

*Vaccine Therapy*

The effect of vaccine therapy in the common cold was studied by Houser,<sup>8</sup> who gave a series of inoculations to a group of students over a period of four years. His statistics revealed that prophylactic vaccination against colds is followed by a lessened severity and duration of the disease. He recommends six to ten small graduated doses of the vaccine, rather than three large ones. There

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was little evidence that colds were prevented by this type of therapy.

A controlled study, made in order to determine the value of three different vaccines which were recommended for the prevention of colds, was carried out by Diehl, Baker and Cowan.<sup>9</sup> One group of students received, unknowingly, sterile physiologic salt solution as a control for the subcutaneously administered vaccine, and another group received lactose-filled capsules as a control for the group receiving the vaccine by mouth. Significant was the marked reduction in the number of colds which the control groups reported as compared with the number for the same group in the previous year. Those receiving the vaccine subcutaneously reported 25 per cent fewer colds per person than did the control group. The authors believe that this reduction, although statistically significant, was not sufficient to justify the time and expense necessary to carry out the intensive method of administration used. The groups receiving orally administered vaccine and Rosenow's streptococcal vaccine had as many colds as their control groups.

In certain individuals the common cold is followed by secondary infection with the streptococcus, the pneumococcus or other organisms, and a sinus infection occurs which prolongs the period of convalescence for two or three weeks or even longer. While it is very doubtful if vaccines protect the patient from the virus infection, they often seem to prevent or ameliorate the period of secondary infection. Since administration is simple and rarely attended by any severe symptoms, their use is justified in patients whose colds are commonly followed by a long period of secondary infection.

#### NASOPHARYNX AND PHARYNX

##### Nasopharyngeal Infection

O'Connor<sup>10</sup> reported 59 patients seen during a period of three years, because of fatigue and low grade fever of prolonged duration, for which there were no symptomatic, clinical or laboratory features that would allow a definite diagnosis. Of these, 55 were found to have a nasopharyngeal infection. The nasopharyngeal flora was studied in most cases and the predominating organisms were found to be, in order of frequency, *Streptococcus viridans*, *Neisseria catarrhalis*, Type 4 pneumococcus, *Staphylococcus aureus*, *Hemophilus influenzae*, *Streptococcus hemolyticus* and Type 3 pneumococcus. Treatment consisted in the local application of silver nitrate in solutions of varying strength, depending on the degree of congestion or in some cases of a weak solution of zinc sul-

fate. This was followed by the application of a 2 per cent aqueous solution of gentian violet or methylene blue. In resistant cases a 0.5 per cent solution of colloidal iodine was used and followed by the dye. When neither of these combinations of drugs produced results, an autogenous filtrate was made, combined with a water-soluble base, and applied directly to the affected area. During the course of the treatment the patient used saline irrigations and mildly antiseptic drops. A large percentage of O'Connor's patients were relieved by these methods.

##### Infection in Fascial Spaces of Neck

In acute infections involving the fascial spaces of the neck, early operation is often necessary to save life. It is dangerous, as Pearse<sup>11</sup> points out, to treat all cervical infections conservatively with compresses and observation until fluctuation occurs, but it is equally dangerous to operate prematurely on a localizing infection. In Ludwig's angina there is a rapid spread of infection to the neck. Early signs may be edema of the floor of the mouth and limitation of motion of the jaw. A hard, brawny, tender swelling of the neck develops, but no point of fluctuation can be found. The location of surgical approach is the submaxillary-submental fascial space. The floor of this space is formed by the mylohyoid muscle and is continuous posteriorly with the submaxillary space. Incision is made into the submaxillary space in the neck and continued forward, severing the fibers of the mylohyoid muscle and so opening the floor of the space.

The parapharyngeal space lies medial to the internal pterygoid muscle and is bounded by the fascia covering the constrictor muscles of the pharynx and the great vessels. This space may be invaded by parotid, pharyngeal or tonsillar infections. Distention of the space with pus pushes the tonsil and pharynx medially and the parotid laterally. Trismus is due to irritation of the internal pterygoid muscle. Pressure posteriorly on the jugular vein causes cyanosis and distention of the superficial veins. Thrombosis of the jugular vein should be suspected if chills or sepsis occur. After localization early drainage is indicated, and there are several routes which may be employed. The most direct approach is often through the tonsillar fossa, especially if the infection follows tonsillectomy. The external approach may be through the submaxillary space or in front of, behind or above the parotid. The approach used should be determined by the individual circumstances, the factor of prime importance being adequate drainage.

## EAR

*Otosclerosis*

In otosclerosis, foci of altered bone commonly form around the footplate of the stapes, gradually immobilizing it, and producing an obstructive deafness of more or less severity. The inner or perceptive portion of the ear is often unaffected by the process, and hearing by bone conduction is excellent. It has been found that the hearing is greatly improved when a window is made through the bony wall of the external semicircular canal. The chief problem lies in maintaining the patency of this fenestra. Lempert<sup>12</sup> has devised a new approach to this region and a method of covering the fenestra with a flap from the cutaneous posterior canal wall and the mobilized eardrum. This has been successful in a high percentage of his patients.

*Role of Drugs in Congenital Deafness*

The possible relation of some forms of congenital nerve deafness to the prenatal administration of certain drugs which are known to have an adverse effect on the hearing has long interested the otologist. Mosher,<sup>13</sup> after ruling out the various causes of hemorrhage into the labyrinth in his experimental animals, found that when Mapharsen, quinine or sodium salicylate was fed to or injected into the mother, hemorrhages occurred in the cochlea of the fetus but not in the cochlea of the mother. The most extensive hemorrhages were caused by Mapharsen and were located in the scala vestibuli, vestibule and semicircular canals. Quinine and sodium salicylate caused hemorrhages which were nearly always in the scala tympani. The results suggest that quinine and Mapharsen have selective action in different parts of the inner ear. It was concluded that certain drugs pass from the mother to the fetus.

*Chemotherapy*

In the field of chemotherapy the importance of sulfanilamide in the treatment of infections due to the beta-hemolytic streptococcus and the pneumococcus has become daily more evident, and an enormous new literature has grown out of its discovery and use. Principles of treatment have been discussed by Long and Bliss.<sup>14</sup> Keefer<sup>15</sup> has reported his work on the subject, reviewed the important literature and discussed principles and methods of treatment. Pneumococcal meningitis has received the special attention of Finland and his co-workers,<sup>16</sup> who report 6 recoveries out of 10 patients treated. The use of sulfanilamide in otolaryngology was reviewed by Schenck.<sup>17</sup> Recently, the United States Food and Drug Administration has released a new drug, sulfapyridine, for general use. This compound, related to sulfanila-

mide, is even more specific for the pneumococcus, and gives promise of reducing even further the mortality in the desperate complications frequently caused by this organism when it invades the upper air passages and ears.

Clinically the toxic symptoms with sulfapyridine are less marked in children than in adults and are essentially the same as those accompanying the administration of sulfanilamide, namely cyanosis, nausea, vomiting, headache, dizziness, mental confusion, skin rashes, agranulocytosis and anemia. The same precautions observed when sulfanilamide is given should be carried out with sulfapyridine. For adults, Evans and Gaisford<sup>18</sup> used an initial dose of 2 gm., followed every four hours with 1 gm. until 25 gm. had been given. Whitby<sup>19</sup> used a slightly larger dose of 5 gm. in the first twelve hours, in lots of 2 gm., 2 gm. and 1 gm., followed by 1 gm. every four hours. At the Children's Hospital (Boston) Davies<sup>20</sup> gives infants up to the age of two a dose of 1.5 gr. per pound every twenty-four hours. In very sick patients the initial dose may be doubled. The drug may be given suspended in milk or a semisolid vehicle such as mashed banana or apple sauce.

*Deafness in Children*

In children, the lymphoid structures are particularly likely to respond to infection by a great increase in size. When this occurs in the nasopharynx, interference with the function of the eustachian tube, with its resultant impairment of hearing, and attacks of otitis media frequent sequels. Removal of the adenoids and tonsils often relieves the deafness and prevents the recurring attacks of otitis media, but in some children this desirable result of surgery is not obtained. Crowe and Baylor<sup>21</sup> report their observations, made in some cases over a period of ten years, on 60 children with impaired hearing due to eustachian-tube obstruction. They found that, contrary to the classic teaching in otology, loss or impairment for high tones did not generally mean a lesion in the inner ear or nerve. The earliest symptom of tubal obstruction was impaired hearing for tones between 10,000 and 16,000 double vibrations. Gradual progression of the deafness occurred, one octave after another, toward the lower end of the scale, until the speech range was affected and the deafness was noticed.

These authors claim that this type of hearing impairment is due to tubal obstruction from hypertrophied lymphoid tissue around and in the pharyngeal orifice of the eustachian tube, as demonstrated by the nasopharyngoscope. In treating this condition, they remove as much of the lymphoid tissue surgically as can be accomplished without damage to the nasopharyngeal structures.

Using a special applicator, radium, in the total dosage of 2 to 2.5 gram minutes, is administered in small doses at intervals of a month to six weeks on each side of the nasopharynx. If there is diffuse granular hyperplasia the radium therapy is supplemented by roentgen therapy, a total dose of 500 r being given in six treatments at intervals of four days. The results of this type of therapy in their reported cases were excellent.

#### TRACHEA AND BRONCHI

##### *Laryngotracheobronchitis*

In the 127 cases of laryngotracheobronchitis reported in the literature there were 37 deaths. Of the patients who underwent tracheotomy, 51 per cent died. Richards<sup>22</sup> believes that tracheotomy is the treatment of choice, and should be performed before the patient is exhausted or an obstructive emergency arises, for then the hope of recovery is slight.

Diphtheria, spasmodic croup or some other milder forms of laryngeal obstruction should be ruled out before tracheotomy is done. If the patient is not relieved by tracheotomy at least one bronchoscopic examination should be made. Masses of debris accumulate in the trachea and bronchi of some patients and produce severe obstructive symptoms.

As Brennemann et al.<sup>23</sup> point out, drugs play a minor role, if any, in the treatment of the disease. The use of belladonna is to be condemned, for it inhibits the secretions and causes the exudate to be even more sticky and tenacious. Such expectorants as ipecac, ammonium chloride and the iodides are of theoretical and questionable value, and because of their objectionable taste they further harass the sick child and may cause him to refuse other fluids. Saturation of the room air by use of the steam kettle and humidifier, while maintaining the temperature around 75° F., is desirable.

##### *Laryngectomy*

Crowe and Broyles<sup>24</sup> discussed their modification of the single stage procedure for total laryngectomy in selected cases. Their variations included subperichondrial resection of the thyroid cartilage to skeletonize the larynx and avoid injury to the muscles, and the formation of a mucous membrane flap from the posterior surface of the larynx to aid in a tension free closure of the pharyngeal defect.

##### *Laryngeal Stenosis*

Schmiegelow<sup>25</sup> has devised a method of treating chronic cicatricial stenosis of the larynx. If the tracheotomy tube has not been placed as far away from the larynx as possible an inferior tracheotomy is first done. Later the larynx is opened and made as normal as possible by the removal of

webs and strictures. An India rubber drain about 5 cm long is introduced into the larynx and fixed in place by a fine silver wire, which is drawn through the neck and thyroid cartilage and cut off flush with the skin on each side. The drain can be removed from above through the mouth with a laryngeal forceps. The period of treatment averaged about six weeks.

##### *Route of Infection to Lung*

The relation of certain types of pulmonary infection to infection in the paranasal sinuses was further studied by Larsell and his co-workers<sup>26</sup>. Using animals, they introduced streptococci into the sinuses and the lymph nodes receiving drainage from them. They found that viable streptococci reached the lung, liver and spleen from both these sources. The anatomical pathway was by way of the paratracheal lymphatic vessels to the great veins and into the right side of the heart and pulmonary capillaries. The organisms that passed through the lung were evidently filtered out in the spleen and liver.

##### *Bronchiectasis and Sinus Infection*

A clinical study of 75 patients with bronchiectasis was made by Goodale<sup>27</sup> in order to determine the role of sinus infection. Chronic sinus infection was present in 46 patients and 29 had normal x-ray films. Of the latter group 18 had a history suggestive of either recurrent acute or mild chronic sinusitis. Twenty-one patients had pneumonia at the onset not preceded by an acute upper respiratory infection, which would seem to indicate that bronchiectasis can occur without a preceding upper respiratory infection. Patients with bronchiectasis showed an increased susceptibility to sinus infections. The sinus infection may develop subsequently and independent of the pulmonary disease. There was no relation between the side of the chest affected and the location of the infected sinus. The incidence of sinus infection was much lower in patients with one lobe involved and such cases were the most favorable for lobectomy. When the chronic sinusitis had become established the chance for further damage to the lung was increased, owing to the greater susceptibility of the patient to repeated upper respiratory infections. When both ethmoids and antrums were infected the best results were obtained by radical procedures on these sinuses.

##### *Plummer-Vinson Syndrome*

This syndrome is characterized by the symptoms and signs of hypochromic anemia, dysphagia, atrophic changes in the lips and oral mucosa, smooth tongue cracking and fissures of the corners of the mouth, early loss of teeth, changes in the nails and splenomegaly. Johnson<sup>28</sup> states

that the syndrome usually appears at from fifteen to twenty years of age, and never after fifty. Malignant changes which appear in the fourth, fifth or sixth decade may have started with a simple hypochromic anemia at the age of puberty. Anemia and atrophic changes in the oral and pharyngeal mucosa should be looked for in all female patients in this age group who complain of dysphagia before they are classified as neurotics or as having a globus hystericus. Jackson<sup>29</sup> reports that of 110 patients with carcinoma of the esophagus, 87 were at some time diagnosed as neurotics. The postcricoid region was the commonest location for carcinoma, and 90 per cent of all carcinomas in this location are in women. The treatment of Plummer-Vinson syndrome is the administration of iron and careful, repeated endoscopic examination of the hypopharynx and esophagus. If webs are present they must be excised. In the absence of webs or bands, deglutition is often improved by simple diagnostic esophagoscopy and the administration of the proper doses of iron.

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## MASSACHUSETTS MEDICAL SOCIETY

## PROCEEDINGS OF THE COUNCIL

Special Meeting, April 26, 1939

A SPECIAL meeting of the Council of the Massachusetts Medical Society was called to order by the president, Dr Channing Frothingham, Suffolk, in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, April 26, at 10 a m. There were 188 councilors in attendance (Appendix No 1).

The minutes of the regular meeting of the Council held on February 1 were presented by the Secretary as published in the *New England Journal of Medicine* for March 9, 1939. The President announced the minutes approved as published.

The Council voted to approve of the nominations by the President to form a special Committee on Industrial Health which was authorized at the meeting on February 1. The committee is as follows:

Dr W Irving Clark, chairman, Worcester  
Dr Noel G Monroe, Middlesex South  
Dr Louis R Daniels, Middlesex South

The President announced the appointment of Dr George L Steele, Hampden, as the official delegate to represent the Society at the annual meeting of the Connecticut State Medical Society. Dr Steele is to succeed Dr Theodore L Story who is unable to attend. The appointment was confirmed.

The Council next proceeded to consider the matter for which the meeting was called, and the President asked the secretary of the Committee on Public Relations to present the report which had been adopted by the committee at its meeting on Wednesday, April 5, and a copy of which was mailed to all councilors on April 12 (Appendix No 2). The Council voted to accept the report and to discuss its contents item by item.

After presentation of Item I, the Council voted to express its disapproval of the proposals as submitted by Health Service Incorporated (Recommendation 1).

Item II concerned a conference held with a representative of the Farm Security Administration of the United States Department of Agriculture. The committee reported that this matter was submitted for the information of the Council and did not ask for action. In the discussion the President expressed the opinion that the Society should take action approving of the recommendations received from the federal government.

Dr Francis P McCarthy, Norfolk, pointed out that the Council had previously gone on record as opposed to the suggestion but, since no motion was before the Council, no action was taken.

Item III concerned the activities of certain old-line insurance companies which are supplying a form of indemnity insurance to policyholders.

In the discussion, the hope was expressed that the insurance companies might take over the whole problem and thus relieve the Massachusetts Medical Society of the responsibility. In response to an inquiry, it was stated that the average cost of such insurance would probably be about \$10.00 per year.

Dr Michael A Tighe, Middlesex North, chairman of the Subcommittee on Social Legislation and Insurance, spoke of the possibility of extending this insurance through the agents of the companies who already collect certain weekly premiums on life insurance. He expressed the opinion that the utilization of this machinery might be a valuable adjunct. He described in some detail the methods involved. In response to queries he pointed out that any type of insurance for a given year sets very definite limitations on what is covered by the premiums. Larger indemnities may be purchased when larger premiums are paid. As to the quality and adequacy of care under the contract, he stated that the companies are not concerned, since the subscriber is allowed to make his own selection of a physician and the company's responsibility is to supply the money to pay for it. The present contracts are made for groups, especially in industry, and the companies do not attempt to offer this insurance to individuals through their industrial agents. There are no available data concerning the number insured in Massachusetts under this plan.

Dr Edward Mellus, Middlesex South, called attention to the experience under savings bank insurance.

Dr M Victor Safford, Norfolk, quoting from a recent conversation with the secretary of representatives of a large number of liability insurance companies, stated that the companies have not, as a rule, found that health insurance policies are profitable. In his opinion, the matter of health and sickness insurance by commercial companies is in a state of flux, and so far, no general scheme has been agreed on.

The Council *voted to approve the principle of indemnity insurance as offered by old-line insurance companies as representing one means of meeting the costs of medical care* (Recommendation II)

After some further discussion of a general nature, the Council proceeded to consider Item IV of the committee's report. It was decided to read the various Sections under this Item, to allow discussion but to take no action upon the individual Sections until the entire matter had been presented.

Dr Allen G Rice, Hampden, maintained that the Council should agree on a principle before discussing details.

Dr John P Monks, Suffolk, reported that when the matter was discussed by the councilors of Suffolk District it was discovered that the various sections constituted details of a plan and that the various subdivisions of Section 9 in reality constituted the more fundamental parts of the proposal.

Dr Tighe was called to the platform to again give the background for the committee's action. He explained that the study and report resulted from the resolution offered by Dr Ernest L Hunt, Worcester, and adopted at the meeting of the Council on February 1. In the opinion of the subcommittee, the Council should decide certain basic principles.

1 Does the Council desire to do something about the problems which have to do with supplying the cost of medical care?

2 By what method does the Council wish to proceed in so doing?

The methods open were, first, compulsory sickness insurance under the direction and control of the government. This method was disapproved by the Council in 1935. Secondly, there remained three types of voluntary methods (1) that supplied by old-line insurance companies, (2) that fostered and encouraged by certain socially minded persons outside the profession and (3) that fostered by the profession itself. The subcommittee had considered the last three possibilities in detail, and the Council at this meeting voted to approve a voluntary method fostered by old-line insurance companies and to disapprove a method fostered by persons outside the profession. But one alternative remained the Society could foster a plan. It was not an easy problem to handle and the committee could probably find more objections than could individual members of the Council. In his opinion, the plan presented contained fewer objections and these objections would not be insurmountable.

Dr Tighe called attention to the fact that medical societies in various communities had already adopted comparable schemes and were now endeavoring to put them into effect.

Dr J Harper Blaisdell, Middlesex East, introduced a resolution which, after considerable discussion, was altered and finally passed as follows: *Resolved, That it is the sense of this meeting that the principle of non-profit medical care insurance be approved.*

The President pointed out that the laws of the Commonwealth are in a very unsatisfactory state as to just what can be done from the point of view of contract principles and prepayment. In his opinion, the next step would be to attempt to clarify the laws so that the Society could proceed with a program which would be legal. He made reference to the diversity of opinion which exists in the legal profession as to what can be done under the present laws.

Dr Elliott P Joslin, Suffolk, referred to a recent meeting of the Suffolk councilors at which the general principle of prepayment insurance for medical care had been approved. He stated that the group present at the meeting passed the following motion:

That the Council of the Massachusetts Medical Society instruct its Committee on State and National Legislation to introduce a bill into the Legislature to legalize the development of prepayment plans for medical care and insurance plans for medical care.

It was the opinion of this group of councilors that any proposal presented to the Legislature this year must be simple and that, if such legislation does not pass, there will be a delay of two years. It was believed that it was impossible to recommend to the Legislature any specific details but that, if a general principle was recommended, it might appeal to the Legislature. He offered the above motion for adoption by the Council.

In the discussion which followed it was apparent that the councilors would be unwilling to authorize a committee to proceed with any plan that involved specific details, unless such details were referred back to the Council for approval. There were numerous questions on the implications of Dr Joslin's motion. Dr Joslin finally withdrew his motion.

The President suggested that the Council re turn to the consideration of the specific proposals in the committee's report, although in his opinion there was something to be said in favor of Dr Joslin's motion since the report appeared to be building a superstructure which might lead to failure of accomplishment because of the present law.

A councilor suggested that, if the Massachu



setts Medical Society approached the Legislature and attempted to set up a scheme of insurance, it might be declared unconstitutional because it might be regarded as class legislation

The President pointed out that any bill submitted would not contain the name of the Massachusetts Medical Society but would be an enabling act similar to the one which permitted the organization of the Associated Hospital Service Corporation of Massachusetts. He pointed out in response to a query from Dr. George L. Schadt, Hampden, that this enabling act was passed without any specific plan. There was still further discussion of Dr. Joslin's proposal.

The Council proceeded to consider Section 1 of Item IV. Dr. Tighe explained in response to an inquiry that the limit of \$1500 annual income was included by the committee without any attempt at being dogmatic in the fixing of a specific sum. This sum was included to cover the low-income group. He did not believe that the committee could concern itself with the source of income.

In the discussion of Section 2, Dr. Charles F. Wilinsky, Suffolk, pointed out that, if the plan should be limited to those patients who were in hospitals, it would result in overtaxing these institutions which are already under a considerable burden as a result of the hospital-insurance scheme. He expressed the hope that the proposal would be extended to cover home and office care.

Dr. Frothingham stated that there was in existence a definite experience table prepared by a group in California which has worked out a prepayment insurance plan to cover the care of patients in homes and offices as well as in hospitals.

Dr. McCarthy emphasized the importance of what Dr. Wilinsky had stated.

Dr. Tighe stated that he had discussed the matter, raised by Dr. Wilinsky, with the director of the Associated Hospital Service Corporation who did not believe that it would injure the hospital plan.

Dr. Walter Bauer, Suffolk, and Dr. Monks called attention to the European experience which seemed to confirm Dr. Wilinsky's opinion.

Dr. William Dameshek, Norfolk, emphasized the fact that it was already difficult to get patients to leave the hospital under the hospital insurance plan. There appeared to be a distinct tendency for a longer stay in the hospital.

Dr. Charles S. Benson, Essex North, expressed an opinion that it would be wise to leave out reference to hospital insurance in Section 2.

Sections 3 and 4 of Item IV were discussed together.

Dr. Edward F. Timmins, Suffolk, expressed his

concern that the Massachusetts Medical Society should undertake the odium of trying to solve a problem that experience had shown to be practically unsolvable in America and elsewhere, and one in which the insurance companies have found with all their experience and machinery that they cannot make a profit. In his opinion there would be much abuse. Individuals who pay annual dues would attempt to get service in some form, and if this were denied, the Society would be regarded as cold and not benevolent. If in attempting to divide this responsibility, clergymen and others were included in the directing body, the profession would lose its control. He expressed the opinion that the name of the Massachusetts Medical Society ought not to appear and further expressed his sorrow for the men who would serve on the committee. He referred to past experience with various societies whose members paid dues for health and accident insurance and subsequently wrecked their organizations by their demands.

Dr. Leroy E. Parkins, Suffolk, raised the question of what would happen, should subscribers desire services of irregular practitioners.

In response to a question Dr. Tighe gave a brief explanation of what had happened in Michigan where a bill is now pending in the Legislature to authorize the organization of an insurance system to provide for total medical care costs through the organization of a corporation with a board of directors, the majority of whom would be members of the Michigan State Medical Society, although the name of the Michigan State Medical Society does not appear in the bill.

Dr. Timmins was concerned with the possibilities regarding irregular practitioners and felt that the entire scheme should be disapproved since the profession is already severely denounced as a "medical trust."

Dr. Frothingham raised the question as to the desirability of suggesting under the plan that the directors be paid.

Dr. Bagnall gave some additional information regarding the medical service in the District of Columbia, which is handled by a director and nine trustees, the majority being chosen by the medical society. He likewise quoted from an article which indicated that in Battle Creek, Michigan, a plan was being put into operation which provides practically complete medical care to husband and wife and two or more children at \$4.00 per month.

Section 5 of Item IV was presented. Dr. Rice referred to the danger of a lay board making up a fee schedule.

Sections 6 and 7 were considered together. In response to a question Dr. Tighe explained that

The Council *voted to approve the principle of indemnity insurance as offered by old-line insurance companies as representing one means of meeting the costs of medical care* (Recommendation II)

After some further discussion of a general nature, the Council proceeded to consider Item IV of the committee's report. It was decided to read the various Sections under this Item, to allow discussion but to take no action upon the individual Sections until the entire matter had been presented.

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1. Does the Council desire to do something about the problems which have to do with supplying the cost of medical care?

2. By what method does the Council wish to proceed in so doing?

The methods open were, first, compulsory sickness insurance under the direction and control of the government. This method was disapproved by the Council in 1935. Secondly, there remained three types of voluntary methods: (1) that supplied by old-line insurance companies, (2) that fostered and encouraged by certain socially minded persons outside the profession and (3) that fostered by the profession itself. The subcommittee had considered the last three possibilities in detail, and the Council at this meeting voted to approve a voluntary method fostered by old-line insurance companies and to disapprove a method fostered by persons outside the profession. But one alternative remained: the Society could foster a plan. It was not an easy problem to handle and the committee could probably find more objections than could individual members of the Council. In his opinion, the plan presented contained fewer objections and these objections would not be insurmountable.

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The President pointed out that the laws of the Commonwealth are in a very unsatisfactory state as to just what can be done from the point of view of contract principles and prepayment. In his opinion, the next step would be to attempt to clarify the laws so that the Society could proceed with a program which would be legal. He made reference to the diversity of opinion which exists in the legal profession as to what can be done under the present laws.

Dr. Elliott P. Joslin, Suffolk, referred to a recent meeting of the Suffolk councilors at which the general principle of prepayment insurance for medical care had been approved. He stated that the group present at the meeting passed the following motion:

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It was the opinion of this group of councilors that any proposal presented to the Legislature this year must be simple and that, if such legislation does not pass, there will be a delay of two years. It was believed that it was impossible to recommend to the Legislature any specific details but that, if a general principle was recommended, it might appeal to the Legislature. He offered the above motion for adoption by the Council.

In the discussion which followed it was apparent that the councilors would be unwilling to authorize a committee to proceed with any plan that involved specific details, unless such details were referred back to the Council for approval. There were numerous questions on the implications of Dr. Joslin's motion. Dr. Joslin finally withdrew his motion.

The President suggested that the Council return to the consideration of the specific proposals in the committee's report, although in his opinion there was something to be said in favor of Dr. Joslin's motion since the report appeared to be failing a superstructure which might lead to failure of accomplishment because of the present law.

A councilor suggested that, if the Massachu-

setts Medical Society approached the Legislature and attempted to set up a scheme of insurance, it might be declared unconstitutional because it might be regarded as class legislation

The President pointed out that any bill submitted would not contain the name of the Massachusetts Medical Society but would be an enabling act similar to the one which permitted the organization of the Associated Hospital Service Corporation of Massachusetts. He pointed out in response to a query from Dr George L Schadt Hampden, that this enabling act was passed without any specific plan. There was still further discussion of Dr Joslin's proposal.

The Council proceeded to consider Section 1 of Item IV. Dr Tighe explained in response to an inquiry that the limit of \$1500 annual income was included by the committee without any attempt at being dogmatic in the fixing of a specific sum. This sum was included to cover the low-income group. He did not believe that the committee could concern itself with the source of income.

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Dr Tighe stated that he had discussed the matter, raised by Dr Wilinsky, with the director of the Associated Hospital Service Corporation who did not believe that it would injure the hospital plan.

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Dr William Dameshek, Norfolk, emphasized the fact that it was already difficult to get patients to leave the hospital under the hospital-insurance plan. There appeared to be a distinct tendency for a longer stay in the hospital.

Dr Charles S Benson, Essex North, expressed an opinion that it would be wise to leave out reference to hospital insurance in Section 2.

Sections 3 and 4 of Item IV were discussed together.

Dr Edward F Timmins, Suffolk, expressed his

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In response to a question Dr Tighe gave a brief explanation of what had happened in Michigan where a bill is now pending in the Legislature to authorize the organization of an insurance system to provide for total medical care costs through the organization of a corporation with a board of directors, the majority of whom would be members of the Michigan State Medical Society, although the name of the Michigan State Medical Society does not appear in the bill.

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Dr Frothingham raised the question as to the desirability of suggesting under the plan that the directors be paid.

Dr Bagnall gave some additional information regarding the medical service in the District of Columbia, which is handled by a director and nine trustees, the majority being chosen by the medical society. He likewise quoted from an article which indicated that in Battle Creek, Michigan, a plan was being put into operation which provides practically complete medical care to husband and wife and two or more children at \$4.00 per month.

Section 5 of Item IV was presented. Dr Rice referred to the danger of a lay board making up a fee schedule.

Sections 6 and 7 were considered together. In response to a question Dr Tighe explained that

the unit system has been adopted in many places throughout the country. Certain procedures under the plan are assigned so many units of value, the attempt being made to have the value of a single unit represent one dollar. When supplying total medical care costs, the value of the unit will vary from month to month or from quarter to quarter. The real value of a unit in any period is governed by the amount collected during that period minus the cost of the administration. The unit may, therefore, vary in value from one dollar to sixty cents or even less. This was one of the reasons for recommending that the proposal be limited to hospital patients in the beginning, until more information is available as to actual costs of operation.

In answering a question by Dr. Alexander A. Levi, Middlesex South, Dr. Tighe stated that, in case there were surpluses, they would be carried over to meet the bills of the next month when the drain on the treasury might be heavier. Dr. Levi said that a statement to this effect should appear in the section.

Dr. Dameshek stated that much of the discussion was immaterial for the reason that the Society is trying to initiate legislation and that it cannot predict what will happen to that legislation in the Legislature. In his opinion, rules and regulations proposed by the Society might not meet with the approval of the Legislature which in turn might initiate a system of its own.

Under the consideration of Section 8 of Item IV a councilor asked what would happen to the patients of a physician who did not belong to the Massachusetts Medical Society and who could not, therefore, be a member of a hospital staff. In Dr. Bauer's opinion, this would again be a question of the patient's choice, not only of hospital but of physician.

Dr. Lincoln Davis, Suffolk, was of the opinion that the free choice of physician constitutes one of the many difficulties in the plan. The Society wishes to assure good medical care. He did not believe that absolutely free choice of physician could be offered with the expectation of providing good medical care.

Dr. Albert A. Hornor, Suffolk, expressed his regret that, because of illness, Dr. Charles C. Lund, Suffolk, was unable to be present since, in his opinion, certain of the proposals in Section 8 were contrary to what the Committee on State and National Legislation is seeking in the way of licensing hospitals. He recalled that Dr. Lund had said that there should be an insertion providing that a physician should be a member of a hospital staff, permanent or courtesy, if he were to be considered under the term "free choice."

Section 9 of Item IV was presented by Dr. Baghall.

Dr. Joslin again suggested that his original motion might be used if a clause was inserted which would bring it in accord with the first four subsections of Section 9. In connection with a query as to the terms "charitable" and "benevolent" he pointed out that these are used with reference to the organization and not with reference to the physician who operates under the organization.

Dr. Joslin again suggested reconsideration of his motion. This was followed by a long discussion in which a number of the councilors participated. The desirability of referring back to the Council any proposed action by the committee was emphasized. There appeared to be objection to the motion in part because Subsection 5 of Section 9 would be eliminated. There was also a question as to the implications of Section 5, several councilors stating that they believed that the Massachusetts Medical Society as such should not be permitted to go into the insurance business. In Dr. Joslin's opinion his motion proposed an enabling act. There was also a discussion as to the sequence to be adopted in proceeding from this point, and objection was raised as to the words "prepayment plans for medical care."

At the suggestion of Dr. Tighe, Recommendations III and IV of the Committee on Public Relations were read at this time, and these were proposed as an amendment to Dr. Joslin's motion. Dr. Joslin then suggested the withdrawal of his motion so as to simplify procedure.

It was pointed out that, under the recommendations previously discussed, the Massachusetts Medical Society as a corporate body would not enter the picture but that a separate corporation would be set up to carry out the proposals. There was a continued attempt to bring together the views of Dr. Joslin and Dr. Tighe which finally resulted in the following action by the Council, when it was voted that the Massachusetts Medical Society take the initiative in the formation of a corporation, non-profit in character, which shall seek to pay the medical-care costs of patients. Following the passage of this vote, Dr. Joslin again asked consideration of his motion in modified form. As finally presented it was as follows:

That the Council of the Massachusetts Medical Society instruct its Committee on State and National Legislation to introduce a bill into the Legislature to legalize the development of insurance plans for medical care.

The discussion was extensive and at times rather heated. One councilor inquired as to the opinion of the Attorney General concerning what could be done under the present law. It was pointed out, however, that such an opinion could not be

obtained by the Society but would have to come indirectly through one of the state departments, such as the Division of Insurance. The question was finally put, and Dr Joslin's motion was lost.

After some further discussion of a general nature Dr Tighe moved

That the Committee on State and National Legislation be instructed to seek legislation covering the matter of non profit prepayment medical care.

The motion was duly seconded. Following remarks by several councilors, Dr Monks suggested that, if the motion were passed, it might put Dr Lund and his committee in an embarrassing position since they would be asked to do something which they might regard as impossible of accomplishment.

The President pointed out that the committee was not bound to any specific action. Dr Tighe explained that, if enabling legislation were passed, there would be a year in which a plan might be developed. There was again an expression of concern as to whether or not the Massachusetts Medical Society as such was about to enter the insurance business.

Since the discussion involved interpretation of certain terms and phrases, Dr Tighe withdrew his motion and substituted a new one. He moved

That the Committee on State and National Legislation, in collaboration with the Committee on Public Relations, be authorized to seek legislation providing for a system of medical-cost insurance as already adopted by the Council.

There was some opinion that no system had been adopted by the Council. Dr Blaisdell, however, pointed out that certain definite principles had been adopted. The Council was in favor of medical-care insurance with the sentiment clearly in favor of a non-profit organization. In his opinion the two committees are to ask for a simple enabling act which is not a statutory change but an act which will permit the establishment of a non-profit medical insurance scheme. The Legislature can adopt or refuse such a proposal. If permission is granted, it becomes the privilege of any seven men, presumably under the action indicated at the meeting, — seven members of the Massachusetts Medical Society, — to form a corporation. The object of this corporation would be to establish a system of non-profit medical care which will have to be passed on by the Commissioner of Insurance. The conditions of membership, based on income, would be established by the directorate, and before such incorporators submit their plans to the Commissioner of Insurance, they would come back to the Council for final authority to proceed.

There appeared to be some question as to the need for an enabling act, but it was pointed out

that counsel of the Commissioner of Insurance had stated specifically that the Associated Hospital Service Corporation, for example, could not carry out this work except with a type of procedure which would be entirely too cumbersome to handle. It would involve, for example, a contract between every doctor and every hospital. It was counsel's advice that the doctors work out their plan just as the hospitals had worked out theirs.

In response to a question by Dr Monks, the President stated that the enabling act would allow any group of people to form a corporation but that all groups must go to the Commissioner of Insurance to obtain their charter and the approval of the conditions under which they would operate.

It was then *voted that the Committee on State and National Legislation, in collaboration with the Committee on Public Relations, be authorized to seek legislation providing for a system of medical-cost insurance as already adopted by the Council.*

Dr Halbert G Stetson, Franklin, asked for an expression of opinion from the councilors present as to whether medical care under the proposed plan should be limited to patients in hospitals or whether it should include patients in their homes or in offices.

The President asked for a show of hands and it was discovered that the great majority favored the extension of the plan to include home calls and office work.

The Council adjourned for the Cotting Lunch-con at 1 10 p m.

ALEXANDER S BEGG, *Secretary*

## APPENDIX NO 1

### ATTENDANCE

BARNSTABLE	J F Burnham
C H Keene	Z W Colson
M E Champion	H R Kurth
W D A Kinney	G L Richardson
	F W Snow
BERKSHIRE	L T Stokes
J J Boland	C F Warren
Solomon Schwager	C A Weiss
BRISTOL NORTH	ESSEX SOUTH
F V Murphy	H A Boyle
	N P Breed
BRISTOL SOUTH	J F Donaldson
G W Blood	S E Golden
E D Gardner	A E Parkhurst
	W G Phippen
ESSEX NORTH	J R Shaughnessy
L R Chaput	J W Trask
E S Bagnall	FRANKLIN
R V Baketel	F J Barnard
C S Benson	H M Kemp

Charles Moline  
W J Pelletier  
H G Stetson

## HAMPDEN

F H Allen  
T S Bacon  
W A R. Chapin  
J L. Chereskin  
E. A. Knowlton  
M W Pearson  
A G Rice  
G L Schadt  
G L. Steele

## HAMPSHIRE

L N Durgin

## MIDDLESEX EAST

R. W. Sheehy  
J H Blaisdell  
L. M. Crosby  
Richard Dutton  
E M Halligan  
K. L. MacLachlan  
R R Stratton

## MIDDLESEX NORTH

C M Roughan  
M L Alling  
A. R. Gardner  
F D Lambert  
G A Leahey  
T A Stamas  
A. W. Stearns  
M A Tighe

## MIDDLESEX SOUTH

F R. Jouett  
C F Atwood  
E W Barron  
W B Bartlett  
G F H. Bowers  
E J Butler  
B F Conley  
D F Cummings  
C H. Dalton  
C L Derick  
J E. Dodd  
D C Dow  
A. W. Dudley  
H G Giddings  
H W Godfrey  
A D Guthrie  
F A Higginbotham  
A M Jackson  
A A. Levi  
R A McCarty  
J A. McLean  
Edward Mellus  
C E Mongan  
J P Nelligan  
E. J O'Brien  
Dwight O'Hara  
W D Reid  
Max Ritvo  
E S A Robinson  
E J Sawyer  
M J Schlesinger

E W Small  
H P Stevens  
H W Thayer  
R H Wells  
M W White  
W S Whittemore

## NORFOLK

F G Balch  
A S Begg  
M. I. Berman  
Myrtelle M. Canavan  
William Dameshek  
G L Doherty  
Albert Ehrenfried  
D G Eldridge  
H. M. Emmons  
J F Ford  
Maurice Gerstein  
W A Griffin  
J B Hall  
C J Kickham  
E L Kickham  
D L Lionberger  
F P McCarthy  
W H. McMann  
Frederick Reis  
A T Ronan  
M V Safford  
J A Seth  
F J Simmonds  
H. F. R. Watts

## NORFOLK SOUTH

N R. Pillsbury  
C S Adams  
R. L. Cook  
H. A. Robinson  
W L. Sargent

## PLYMOUTH

\*A. W. Carr  
J E. Brady  
H A Chase  
A L. Duncombe  
S W Goddard  
\*P B Kelly  
D W Pope  
W H. Pulsifer  
H C Reed

## SUFFOLK

Walter Bauer  
H L. Blumgart  
W B Breed  
W J Brickley  
C S Butler  
David Cheever  
H M. Clute  
Lincoln Davis  
R L. DeNormandie  
A B Donovan  
G B Fenwick  
Channing Frothingham  
Joseph Garland  
John Homans  
A A. Hornor  
Rudolph Jacoby  
E. P. Joslin

H A Kelly  
R. I. Lee  
W J Mixter  
J P Monks  
R. N. Nye  
F W O'Brien  
J P O'Hare  
R. B. Osgood  
L E Parkins  
L. E. Phancuf  
Helen S Pittman  
W H Robey  
M C Sosman  
E F Timmins  
S N Vose  
I J Walker  
Conrad Wesselhoeft  
C F Wilinsky

## WORCESTER

C A Sparrow  
J C Austin

## WORCESTER NORTH

H. C. Arey  
W E. Currner  
T R. Donovan

\*Takes office at the annual meeting not included in total count

## APPENDIX NO 2

## REPORT OF COMMITTEE ON PUBLIC RELATIONS

The following report was adopted by the Committee on Public Relations at a meeting on Wednesday, April 5

## MEDICAL CARE PLANS

Several weeks ago, after there had been a submission to the Committee on Public Relations, itself, of several plans whereby those of moderate means might more easily finance their medical care, these plans were referred to the Subcommittee on Social Legislation and Insurance of the Committee on Public Relations for study. Further impetus was given to this study as a result of the action of the Council of the Massachusetts Medical Society in approving a resolution offered by Dr. Ernest L. Hunt in this Council, February 1, 1939. This resolution reads as follows:

Whereas, within our population there is a considerable group who cannot be classed as indigent but whose incomes do not exceed a bare existence level and for whom adequate medical care other than through charity is not provided by any existing agency, and

Whereas, so far this society has taken no effective steps toward a solution of this problem, and

Whereas, agencies outside the ranks of organized medicine are pressing for action looking to the provision of medical service for this low income group for which reason the initiative may pass from our control and result in ill-advised plans detrimental to patient and physician alike, be it therefore

Ordered by the Council that the Committee on Public Relations (or a special committee of five appointed by the Chair) study the problems of medical service for this low income group particularly in relation to voluntary insurance, co-operative or contract service plans, determine the principles which this society may properly endorse, and secure or devise acceptable plans for furnishing and administering such medical service. This committee shall submit its report with recommendations to the Council at a subsequent meeting.

As a preliminary to the study of the several plans which the Subcommittee on Social Legislation and Insurance had before it, it became evident that this subcommittee needed a guide, mainly in connection with principles involving contract practice. The subcommittee therefore adopted as its guide, Chapter III, Article VI, Section 2 and Section 3 as set forth in the Code of Ethics of the American Medical Association, which are as follows

#### CONDITIONS OF MEDICAL PRACTICE

Section 2 — It is unprofessional for a physician to dispose of his services under conditions that make it impossible to render adequate service to his patient or which interfere with reasonable competition among the physicians of a community. To do this is detrimental to the public and to the individual physician, and lowers the dignity of the profession

#### CONTRACT PRACTICE

Section 3 — By the term contract practice as applied to medicine is meant the carrying out of an agreement between a physician or a group of physicians, as principals or agents, and a corporation, organization, political subdivision or individual, to furnish partial or full medical services to a group or class of individuals on the basis of a fee schedule, or for a salary or a fixed rate per capita

Contract practice per se is not unethical. However, certain features or conditions if present make a contract unethical among which are

- 1 When there is solicitation of patients, directly or indirectly
- 2 When there is underbidding to secure the contract.
- 3 When the compensation is inadequate to assure good medical service.
- 4 When there is interference with reasonable competition in a community
- 5 When free choice of a physician is prevented
- 6 When the conditions of employment make it impossible to render adequate service to the patients
- 7 When the contract because of any of its provisions or practical results is contrary to sound public policy

The phrase free choice of physician, as applied to contract practice, is defined to mean that degree of freedom in choosing a physician which can be exercised under usual conditions of employment between patient and physician when no third party has a valid interest or intervenes

The interjection of a third party who has a valid interest or who intervenes does not per se cause a contract to be unethical. A valid interest is one where, by law or necessity, a third party is legally responsible either for cost of care or for indemnity. Intervention is the voluntary assumption of partial or full financial responsibility for medical care. Intervention shall not proscribe endeavor by component or constituent medical societies to maintain high quality of service rendered by members serving under approved sickness service agreements between such societies and governmental boards or bureaus and approved by the respective societies.

Each contract should be considered on its own merits and in the light of surrounding conditions. Judgment

should not be obscured by immediate, temporary or local results. The decision as to its ethical or unethical nature must be based on the ultimate effect for good or ill on the people as a whole.

With these principles herein set forth as a guide, the subcommittee proceeded to study the various plans submitted to it, as well as many other plans under consideration throughout the country which were found available.

It was recognized that many of these plans came from groups of well intentioned citizens and that even though the process might be laborious the subcommittee should extend to these groups the courtesy of discussing their plans with them

#### ITEM I

On March 1, 1939, this subcommittee met the representatives of Health Service Incorporated, an organization which seeks to supply medical care to people whose maximum income is \$3000 a year. This organization seeks to be set up under Chapter 180 of the Massachusetts laws, which chapter prescribes the methods by which a charitable institution may be organized

The Committee on Public Relations, in the preliminary discussion of this plan, found certain very definite objections to it, and these objections were set forth in a communication which was sent to Health Service Incorporated. These objections were as follows

1 That as the proposals came to us, free choice of physician upon the part of the subscriber could in nowise be maintained. It was argued in respect to this objection that under this system, into which the subscriber entered voluntarily the mere fact that he had so subscribed gave him freedom of choice of physician. The subcommittee felt that there were two principles involved at this point, and that these principles involved should not be considered as one, or confused. It was pointed out that, of course, the subscriber was free to join or not as he saw fit, but it was also pointed out that once he had joined he was not free to choose any physician, but that he was very definitely limited to those physicians who might be under contract with Health Service Incorporated.

2. That the tentative proposals as they appear to us seemed to indicate that it was the desire of Health Service Incorporated to set up a certain definite place from which many of the services would emanate. In our discussion with this committee, that this was the actual policy of Health Service Incorporated became very clear. Much was said about how well the services of a certain Boston institution were being used in the morning and evening, and how poorly these services were being used in the afternoon.

3 The question as to whether agreement on a schedule of fees should only be arrived at after consultation with local medical societies, did not seem to greatly impress the Health Service Incorporated representatives as important. Furthermore, in our investigation of this plan we found that that part of the plan which proposed to utilize the Associated Hospital Service Corporation as the means of hospitalizing Health Service Incorporated's subscribers was entirely without warrant—no such agreement having been made between the Associated Hospital Service Corporation and Health Service Incorporated.

*RECOMMENDATION I. The Committee on Public Relations recommends disapproval of the proposals as set forth by Health Service Incorporated*

## ITEM II

On March 1, 1939, the Subcommittee on Social Legislation and Insurance met with Mr. Kenneth E. Pohlmann, classified as a co-operative specialist, and employed by the Farm Security Administration of the United States Department of Agriculture. This conference was in connection with the Farm Administration's plans for financing the cost of sickness for approximately 500 Massachusetts farmers and their families, to whom the Farm Administration had made loans averaging between \$400 and \$500. It developed as a result of our conversation that these loans were made only after the individual farmer's capacity to repay the loan was fairly well established. The Farm Administration, in addition to making the loan, sent certain experts to the farm itself to determine the reasons why it was not supporting those who lived upon it. The Farm Security Administration proposes to set aside the sum of \$15 a year, for each of these 500 farmers. It asks the Massachusetts Medical Society to act as trustee of this fund, and also to set up a schedule of fees. This \$15 per family will represent a pool which will be divided into twelve parts, one for each month. This will make available \$625 a month for payment of the doctors' bills of these 500 farmers. In the event that for any given month there is a surplus, when all the doctors' bills for that month have been paid, that surplus shall be carried over and accredited to those months in which, for reasonable reasons, the drain on the fund would ordinarily be greater. In the event that the bills for any given month are greater than the amount contained in the pool, inclusive of that carried over from surpluses of previous months, there will be a pro rata reduction in the amount paid to doctors on their bills. This concerns medical service ordinarily dispensed by a general practitioner, and is exclusive of surgical operations, and so forth. The trustee shall receive \$50 per family per year for services rendered.

*The Committee on Public Relations looks with favor on this plan which has the endorsement of the American Medical Association. We do not now offer it for discussion, but merely for the information of the Council.*

## ITEM III

We think we have it correctly when we say that old line insurance companies are, at present, unwilling to go beyond the supplying of credits in the form of dollars, which may be used toward the costs of medical care. This attitude upon the part of old line insurance companies has profoundly impressed the committee, and has greatly influenced its judgment in setting limitations on what it regards as the major recommendations of this report. An analysis of many such types of insurance contracts, originating in various old line insurance companies, showed very little advantage possessed by one over the other. Such contracts, wherever they do appear, cannot and really do not differ at all, because they are all founded on the same tables and proceed from the same actuarial source.

**RECOMMENDATION II** *The Committee on Public Relations recommends approval of the principle of indemnity insurance as offered by old line insurance companies as representing one means of meeting the costs of medical care.*

## ITEM IV

The committee was greatly impressed by the releases which came from the Michigan State Medical Society

describing the forthright manner in which this organization proposed to meet the costs of medical care for those in the moderate and low income groups. Correspondence with Dr. Foster, secretary of the Michigan State Medical Society, further elaborated and clarified these releases. We shall not enter at this time into the details of this plan.

At this point the committee turned to a consideration of the tentative proposals as offered by Mr. R. F. Cahalane, director of Associated Hospital Service Corporation. As was pointed out by Mr. Cahalane these proposals were his, and did not emanate from the Associated Hospital Service Corporation.

Evolving from these proposals the Committee on Public Relations offers the following principles upon which may be set up an insurance plan, by means of which the costs of medical care may be met for those in the low income group.

**Section 1** Medical care plans should be on a voluntary basis, and available to those of low incomes, as a means of financing the total costs of their medical care. By low incomes is meant family incomes in the aggregate up to \$1500.

**Section 2** Such medical care in the beginning should be limited to that supplied to patients while in licensed hospitals. This assumes the enactment of pending legislation to vest control of hospital licensing in the Department of Public Health. The committee finds that there is some actuarial guidance for such a plan when so limited. There is no such guidance at the present time for extending medical care on an insurance basis to the home and to doctors' offices. The committee believes that out of the experience gained with this limited plan sufficient tables may be set up to enable the plan to be extended at a later date to include home and office care.

**Section 3** The Massachusetts Medical Society should assume the control and the direction of such a medical care plan. The responsibility for the success of this plan, however, should not be borne by the medical profession exclusively. Labor, industry, and the laity generally, the beneficiaries under such a plan, have a responsibility which must be assumed if such a plan is to succeed.

**Section 4** The actual management of such a plan shall be vested in a board of directors, the majority of whom shall be members of the Massachusetts Medical Society. These directors shall be nominated by the President and approved by the Council. The directors may be paid reasonable compensation for their services. Labor, industry, the law and the church might very well be represented on such a directorate. The combining of the business end of this medical care plan with that of a hospital service corporation might very well result in a decreased overhead for both organizations and in other advantages.

**Section 5** Payment of doctors' fees should be on the basis of a fee schedule set by the board of directors.

**Section 6** It may be said that there are two principal factors in determining fee schedules which must be nicely balanced one against the other. It is obvious that if the fee schedule is inadequate, the service will suffer, and if, on the other hand, the fee schedule is too high, the salability of the medical care contract will be reduced. It has become increasingly emphasized



that the insurance principle should be invoked to the end that medical care costs might be spread so evenly over a whole group as to represent no particular burden on any individual member of the group. If this is true then, in the insurance plan which we propose, the matter of fee schedules should not be approached in the spirit that the medical fees must be cut. The thought rather should be to keep the fees as high as is compatible with the salability of the individual insurance contract. The important thing is to bring good medical care to those who individually may not be able to purchase it in the open market. This effort must not be hamstrung at the very outset by an insistence on premiums so low as to make reasonable medical compensation impossible.

Section 7 The committee inclines toward the unit system as the method of choice in the payment of doctors' bills. It does this because this seems the best way to maintain the insurance principle. The value of the unit will vary from month to month, or quarter to quarter, depending on the relation which the amount of doctors' bills presented during that month or quarter will have to the amount of money taken in during that period, after the administrative costs have been set aside.

Section 8 Patients insured under this plan shall have free choice of physician. Such physicians shall not necessarily be members of the Massachusetts Medical Society. Such physicians shall not necessarily be members of regular hospital staffs. The activities of such physicians in the care of hospital patients shall be regulated by hospitals only to the extent to which they have always been regulated.

Section 9 Such a medical care plan as herein outlined can only be set up under Massachusetts insurance laws by a special act of the Legislature. This legislation should provide

- 1 Enabling provisions
- 2 Adequate public control through the Department of Insurance.

- 3 Non profit basis of operation.
- 4 Declaration of such a plan as charitable and benevolent, and exempt from taxes of state, or political sub-division thereof.
- 5 That business management to be handled as determined under Section 4

RECOMMENDATION III *The Committee on Public Relations moves the adoption in principle of the medical care plan as outlined in the foregoing principles*

RECOMMENDATION IV *The Committee on Public Relations moves that the Council of the Massachusetts Medical Society foster an attempt to obtain the necessary legislation, with the very definite understanding that no system shall be set up under such legislation until it is finally approved by the Council of the Massachusetts Medical Society*

The President, CHANNING FROTHINGHAM, *Chairman.*

Barnstable	Merrill E. Champion
Berkshire	Patrick J. Sullivan
Bristol North	Francis H. Dunbar
*Bristol South	Aubrey J. Pothier
Essex North	Elmer S. Bagnall,
	<i>Secretary</i>
*Essex South	George K. Fenn
Franklin	Halbert G. Stetson
Hampden	Patrick E. Gear
*Hampshire	Lawrence N. Durgin
Middlesex East	J. Harper Blaisdell
Middlesex North	Michael A. Tighe,
	<i>Vice-Chairman</i>
Middlesex South	David C. Dow
Norfolk	Francis P. McCarthy
Norfolk South	William G. Curtis
Plymouth	Charles D. McCann
Suffolk	Albert A. Hornor
Worcester	Ernest L. Hunt
Worcester North	Harry R. Nye

\*Not present.

## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### RICHARD CLARKE CABOT AND THE CLINICOPATHOLOGIC CONFERENCE\*

RICHARD C. CABOT, the founder of these exercises, died three days ago on May 8. It seems only fitting on this occasion to devote a few minutes of the hour to his memory. I can think of no more appropriate way to do this than to review briefly the history of these exercises which he developed and popularized till they have become one of the most characteristic features of American medical teaching. Let me read to you Dr. Cabot's own version of the story, quoted from a recent letter to Dr. Frederic A. Washburn which will appear in full in Dr. Washburn's forthcoming history of the Massachusetts General Hospital.

In 1895 I began using, in private quiz exercises at my own office, some of the printed case histories which had been used by Dr. Frederick C. Shattuck on the examinations in clinical medicine. Through my association with him I knew the outcome of these cases, sometimes by autopsy, sometimes by surgical operation, and sometimes by lapse of time and clinical observation. Later I began to use these same cases and others like them in exercises given at the Harvard Medical School to the third year class, beginning about 1900. In these exercises there was no association with the pathologist, and no demonstration of postmortem results. The exercises were given wholly by myself, though each student had a copy of the case, as in the clinicopathological exercises later begun. At the end of each case discussion, I simply told the class what the outcome of the case had been. Some of these cases never came to autopsy, and in those the therapeutic result was often part of the evidence as to the diagnosis. Therapeutics could therefore be more interestingly and appealingly discussed than in cases ending with autopsy. Seventy-eight of these cases, with questions about each, were published by me in 1906.

As soon as I began to have the opportunities of ward service at the Massachusetts General Hospital, beginning with 1908, I was much impressed by the undesirable separation between the clinical men and the pathologists. One day I discovered in an old volume of bound records a case diagnosed as neurasthenia (nervous prostration), and looking at the final lines of the record saw that the patient had died and that an autopsy had been performed. Yet the diagnosis of neurasthenia still stood as the only clinical diagnosis,

both on the record and in the index. This curious blunder aroused me so much that I went at once to the Pathological Laboratory and looked up the postmortem record of the case. I found that the patient had died of cancer of the pleura but had had neurasthenic symptoms and vague intercostal pain which had misled the clinicians. What especially impressed me was that the clinical diagnosis had never been changed, presumably because the clinicians were unaware of the postmortem result.

Soon after this, at the beginning of the year 1910, I began, on my own initiative, to hold exercises with the house officers and medical visitors to the hospital—a weekly exercise in connection with Dr. J. Homer Wright, modeled essentially like the later clinicopathological conferences. After the first few years Dr. Oscar Richardson succeeded Dr. Wright. In 1911 I published 100 case histories similar to those which I was using in the exercises just described, but not all with autopsy. Later in the same year I published 350 case histories, most of them with postmortem, under the title *Differential Diagnosis*, Volume I, followed by 317 further cases in 1914, as Volume II. Soon after this my informal and voluntary exercises with the house officers and graduate students became a regular exercise for the third year class in medicine. Later they were scheduled for the fourth year class, and thus continued up to my resignation as professor of clinical medicine in 1933. The exercises were then taken over by Dr. Tracy B. Mallory and given for and with the assistance of the whole medical and surgical staff and for the whole hospital population, interns and students as well as physicians, as they are at the present time, each member of the staff taking his turn at discussing a case.

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TRACY B. MALLORY

\*Read at the clinicopathological conference at the Massachusetts General Hospital on May 11, 1939.

A sixty-three-year-old white married insurance broker was admitted complaining of pains over the left shoulder blade and left upper arm.

About five months before entry the patient noticed a gradual onset of dull aches and pains at the top and bottom of the left shoulder blade, which persisted for about two weeks. At this time, on getting out of his automobile, he experienced a severe sharp pain in the left shoulder blade and upper arm over the deltoid area. It was necessary for him to sit back in the car, and he broke out in cold perspiration. His physician made a diagnosis of bursitis and kept the shoulder strapped for four or five days. The arm was kept in a sling for several weeks and the pain practically disappeared. About two months after onset the patient went swimming, at which time his shoulder again became painful. A few days later after moving some furniture, more severe pains developed. Six weeks before admission he suffered a very acute episode of pain in the shoulder blade and over the entire surface of the left upper arm, treatment and massage were given, and the patient sent home to bed. Following this he was restless, had persisting dull aches and pains was constipated and began losing weight. Four days before entry an episode of severe pain recurred. He described it as a "grating" pain. It occasionally radiated from the shoulder blade through the chest and heart to the breast. There was no dyspnea or palpitation. The pain was accentuated by sneezing, coughing or movement. There was no paresthesia, numbness, or burning sensation in the arm. On the day before admission there was another attack of severe non-radiating pain in the shoulder. He did not have headache. Heat and codeine finally gave relief.

Physical examination showed a well-developed, moderately obese man complaining of pain in the left scapula and down the left arm to the elbow. Many pigmented moles were distributed over the body. Examination of the head and chest was negative, as was that of the shoulders. The blood pressure was 125 systolic, 75 diastolic, in the left arm, and 128 systolic, 80 diastolic, in the right arm. The abdomen was slightly distended with gas. There was moderate left costovertebral tenderness. No masses were palpable. Rectal examination was negative. The prostate was negative. There was moderate limitation of rotation of the cervical spine to both right and left. Neurological examination was negative throughout, in-

cluding the arms. No lymph nodes were palpable. The temperature was 99.5°F, the pulse 75, and the respirations 18.

Examination of the urine was negative. A Bence-Jones protein test was negative. The blood showed a red-cell count of 5,660,000 with 95 per cent hemoglobin, and a white-cell count of 21,900 with 58 per cent polymorphonuclears, 28 per cent small lymphocytes, 12 per cent mononuclears, 1 per cent eosinophils and 1 per cent basophils. A blood Hinton test was negative. The serum calcium was 10.06 mg per 100 cc, the phosphorus 3.24 mg and the phosphatase 3.16 Bodansky units. A lumbar puncture was negative. Two stool examinations were guaiac negative. An electrocardiogram showed a normal tracing.

X-ray films of the cervical spine, chest and left shoulder girdle revealed extensive destruction of the left first rib. The process was entirely osteolytic in nature, without any evidence of new-bone formation. The overlying soft tissues were increased in density, the lung field showing diminished radiance. The head of the left humerus was deformed, due to an old incompletely united fracture. The heart shadow was prominent in the region of the left ventricle. The aorta was tortuous. Examination of the dorsolumbar spine and pelvis revealed no evidence of disease. There were multiple areas of calcification in the prostate. An intravenous pyelogram was negative. On the eleventh hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. GRANTLEY W. TAYLOR. This history is fairly extensive, but from it I get very little. In the past history there was pain, which is perfectly adequately accounted for by finding the lesion in the rib,—some constipation, and weight loss, which may be significant. At entry, there were many pigmented moles over the body,—which conceivably might have some significance,—an abnormal white-cell count of 21,900 with not a preponderance of polymorphonuclears, and no other significant findings except the x-ray films which are going to be of much use to us in the discussion of the problem presented by this process. Destructive lesions in the bone are quite like a box of candy. You can shake and rattle and push it around, but until it is opened you cannot tell what is inside. It may be candy, it may be nuts or marbles. With lesions in the bone you cannot say whether you are dealing with a bone tumor, an inflammatory process or some process of a systemic or metabolic nature. You may be deal-

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the peripheral blood smear which points to it. We must go back to that white-blood-cell count of 21,900 with a relatively normal differential count. It certainly is not characteristic of infection and not, so far as I know, similar to the blood picture associated with any primary neoplasm of the bone. Plasma-cell myeloma is described as occurring in a single bone, as opposed to the generalized form, but it should be associated with certain characteristic chemical changes in the blood or manifestations in the blood smear. The serum protein is not recorded, but they looked for Bence-Jones protein in the urine and failed to find it, there is no description of plasma cells in the circulating blood.

I confess to being stuck. I think that this patient was explored with the idea of finding what the diagnosis was and that the specimen passed to the pathologist, giving him the privilege of making a diagnosis. I vote first of all for reticulum-cell sarcoma of the bone, and second, for metastatic hypernephroma.

DR. TRACY B. MALLORY: There was one other question that entered the differential diagnosis. Someone suggested Pancoast tumor. I wonder if Dr. Schatzki has an opinion about that. Certainly the picture is not what was originally described by Pancoast. That was a tumor of the superior sulcus which involves the ribs secondarily and also produces a definite Horner's syndrome. The idea of a specific type of tumor or specific disease entity is being gradually abandoned. The Pancoast syndrome still holds, but this case does not fit it.

DR. MALLORY: Dr. Simmons, have you any comment?

DR. CHANNING C. SIMMONS: I saw this case in consultation and know the diagnosis so that I do not think it is fair to say anything. My preoperative diagnosis was, first, plasma-cell myeloma or Ewing's tumor, and second, a metastatic tumor, source undetermined.

DR. HOWARD B. SPRAGUE: It is of some interest that the cardiologist gets into this field once in a while because the patient has pain in the left arm. The story of acute attacks with radiation of pain into the chest, with sweating and collapse, brings up the question of coronary occlusion. I have had several rather similar cases. In this particular instance I saw the patient before x-ray study and said, "Take an x-ray film of the shoulder because I think he may have a tumor of the superior pulmonary sulcus." I heard later, evidently incorrectly, that the x-ray plate had confirmed this diagnosis. That is all I know about the patient. I assumed anyway that the case was distinctly out of my field.

# PREOPERATIVE DIAGNOSIS

Osteogenic tumor of rib

## DR. TAYLOR'S DIAGNOSIS

- 1 Reticulum-cell sarcoma
- 2 Metastatic hypernephroma

## ANATOMICAL DIAGNOSIS

Metastatic carcinoma

## PATHOLOGICAL DISCUSSION

DR. MALLORY: This patient was operated on by Dr. Edward D. Churchill, primarily, I believe, as Dr. Taylor suggested, for the purpose of biopsy and of making a diagnosis, but with the secondary thought that it was conceivable that there was an isolated tumor of the bone that might be cured if it proved to be resectable. An effort was made to resect the first rib, but it was found to be so completely destroyed by tumor that it fragmented with comparatively gentle traction, so it was not possible to take it all out. The central portion was removed and showed on section quite obvious metastatic adenocarcinoma. We were unable to state with any certainty the primary source. In the succeeding weeks that the patient remained in the hospital the search for the primary source was continued and finally something was found in the large bowel which Dr. Schatzki can show us. If I remember correctly, the members of the X-ray Department were not certain that the polypoid lesion was malignant, but in view of the constant metastasis I think that it almost certainly is.

DR. TAYLOR: It is of interest that he had negative guaiac tests. The only thing that might have suggested the diagnosis was slight constipation and loss of weight, which were studied only to the extent of doing guaiac tests on the stools.

DR. SCHATZKI: There is very little visible on the big films of the colon. We have spot films which I suppose were taken over the junction of the descending colon with the sigmoid, where you can see a polypoid tumor measuring about 4 cm in diameter. It has a relatively smooth surface, as do all polypoid tumors of the colon. It is usually possible to say whether a tumor is malignant, but it is never possible to be certain that it is benign.

DR. TAYLOR: A single metastasis to bone from the gastrointestinal tract occurs but it is relatively rare. We had an interesting patient who came to the Pondville Hospital with a tumor involving the maxilla on which we were about to operate. In the past history we discovered that she had had a previous operation by Dr. Daniel F. Jones, at the Massachusetts General Hospital, and

ing, furthermore, with destruction due to external pressure. The history may shed some light on what is going on, and you may get positive information from the laboratory data, but more often the history is noncommittal, the laboratory data fall within normal limits and you are shifted back to your hunch which was based on the x-ray film.

DR. RICHARD SCHATZKI: This, for comparison, is the first rib on the right side, which is completely normal. The first rib on the left is only visible in the immediate paravertebral portion and in the region of the calcified cartilage adjoining the sternum. The rest of the rib is destroyed. In place of the rib there is this soft-tissue mass, there is no evidence of new-bone formation in the area of destruction.

DR. TAYLOR: Let us first give a little thought to the possibility of extrinsic pressure. We note with some interest that the surgeons took an electrocardiogram, I dare say because the pain was in the left shoulder and they wondered if it might have a cardiac origin. It is hard to think what kind of cardiac disease could destroy a rib unless it were an aneurysm, and it is difficult to consider aneurysm of the subclavian vessels without some definite abnormality on physical examination in that area, which he lacked. Pressure from a soft-tissue tumor, such as a neurofibroma, would, it seems to me, also necessarily imply the presence of some mass which could be felt, and it might also be reasonably expected to have exerted pressure on some bone other than the first rib, such as the clavicle or a vertebra. I think that we can eliminate extrinsic pressure as a cause of this change. I believe that Dr. Schatzki will agree that this picture is not characteristic of the smooth appearance of the bone defect which is usually associated with extrinsic pressure.

As regards the possible infections, we always must consider, in passing, osteomyelitis, tuberculosis, syphilis and other less common types of infection. The temperature chart was well behaved. There was no evidence of local inflammatory change. The blood Hinton test was negative, and again you see no evidence of bone regenerative changes such as might reasonably be expected in an infectious lesion. Let us also consider lesions such as Paget's disease and osteitis fibrosa cystica which should manifest themselves in some alteration of the chemical constituents of the blood, which is not present in this case. It is a little surprising to me that an operation was performed, apparently with some security, without x-ray films of other parts of the skeleton, I certainly should have been prompted to have had them taken. To be sure we have flat plates and

pyelograms which give access to a great deal more than was immediately investigated. These were negative. It is reasonable to suppose that this lesion is unique and not part of a widely disseminated process.

We are thrown into the group of bone tumors, and I am not aware of any benign tumor which gives rise to a completely destructive lesion in that area. We sometimes see lesions such as hemangiomas which result in a great deal of bone destruction and often excite no real proliferative changes, but I think they would tend to manifest themselves at some earlier age than sixty-three. I think we must place our chief emphasis in diagnosis on malignant lesions of the bone, either primary or metastatic. Against its being metastatic are the facts that the lesion is unique, insofar as we know, that it does not have any other skeletal manifestations and that there is nothing in the history or physical findings to give grounds for suspecting a primary focus. With hypernephroma, we must realize that bizarre metastasis to bone is not unusual and that urological study often fails to reveal the presence of a primary lesion, which may be very small and may become apparent only a long while after the metastatic process has been recognized. When we turn to the primary malignant tumors of bone, first and by all odds the commonest is osteogenic sarcoma, which almost invariably shows evidence of osteoplastic activity, very commonly associated with an elevated phosphatase reaction. It is worthwhile to consider that in osteogenic sarcoma the age in stance tends to be lower, except in association with Paget's disease of the bone, however, there is no evidence of Paget's disease in the skeleton. Ewing's tumor is also one that primarily occurs in a younger age group, its x-ray appearance is by no means characteristic, since it may simulate a considerable number of other bone conditions, but insofar as there is any common or frequent picture of Ewing's tumor, it does not coincide at all with this picture here. Primary Hodgkin's disease of the bone is rare, I know of no way of making a diagnosis except by biopsy or by manifestations of Hodgkin's disease elsewhere. Again, I should like to draw attention to the group of tumors described by Drs. Parker and Jackson\*—the reticulum-cell sarcomas of the bone. Their series of 17 cases persuaded them that it was a disease chiefly of younger age groups, but I think with a small series of that sort you cannot say that it may not perfectly well also manifest itself in older people. There is no entirely characteristic x-ray picture, and no diagnostic feature in

\*Parker, F. Jr. and Jackson, H. Jr.: Primary reticulum cell sarcoma of bone. *Surg. Gynec. & Obst.* 68:45-53, 1939.

was present, which would seem to suggest that if there were an obstruction on the right side it had become so chronic that the kidney pelvis had lost its power to contract against the obstruction and hence could no longer cause pain. She had never had any pain over the right kidney or any history of renal colic, which would seem to suggest that if there were an obstruction in the right ureter it had come on gradually, and hence was not the type one would expect to accompany the passage of a ureteral calculus.

The kidney which has lost its function must have done so either because of some destructive process in the kidney, such as an old tuberculosis or a chronic pyelonephritis of years' standing which had destroyed the kidney tissue or because of an obstruction of the ureter which, through back pressure, had prevented the kidney from functioning. Which of these things is the case here, I am not just sure, although the fact that the right kidney outline was unusual in shape but small would seem to suggest a chronic inflammatory process. Of course you might get a congenital atrophic kidney which would cause such a picture, but if there were a hydronephrosis which was responsible for the inability of the kidney to put out the opaque medium we should expect to find a large kidney instead of a small one and probably a tender kidney, although a long-standing hydronephrosis does not continue to be tender in many cases.

The right kidney disease and the bleeding certainly did not come from the bladder, and cystoscopy was of no help in determining the source of the bleeding for at the time of examination the bleeding had stopped. The record does not say whether the catheter was passed by the obstruction, but from the fact that she did not have a good retrograde pyelogram I think we must assume that it did not.

May I see the x-ray films?

DR TRACY B. MALLORY: They have disappeared.

DR SMITH: Non-opaque stones are really quite rare, and as time goes on we find fewer and fewer of them. Furthermore, there are some things about this case which are rather against stone. There was no history of acute renal colic. This is not necessary, but we find it in a very large proportion of cases with impacted renal stone particularly if the stone has been there long enough to cause destruction of the kidney. Another thing which one might think of is a blood clot, however, the duration of the symptoms seems to have been too long. It might possibly be due to a primary tumor in the lower ureter or a tumor which was secondary to papillary carcinoma of the renal

pelvis, which as you know is very prone to metastasize down the ureter. One of the findings which makes me suspect tumor of the ureter is the rather profuse bleeding of the tumor when the catheter was poked against the obstruction. The tarry thick blood from the ureter coming out in a slow oozing stream is also strongly suggestive. If you get bleeding on passing a catheter into the ureter and then the catheter goes a little farther and you drain clear urine, you can be strongly suspicious of a ureteral neoplasm, but we do not have that information here.

I think one might have obtained a little information from vaginal examination. The obstruction was very low, and one probably could have felt the base of the bladder very plainly and could have palpated a mass in the region of the lower ureter.

I believe that the diagnosis lies between stone and tumor of the ureter, either primary or secondary to tumor in the kidney. One gets a good deal of information in these cases from doing the cystoscopy oneself, particularly from the way the catheter goes into the ureter and from how the obstruction feels when one gets against it. With a stone, by persistent attempts, one can usually pass a catheter, and the fact that on all three occasions no catheter was passed makes me think that, with the destroyed kidney, the impassable obstruction, the rather profuse bleeding on instrumentation and the bleeding preceding cystoscopy, the obstruction is more likely to have been due to tumor of the ureter than to a stone.

DR MALLORY: Dr Kelley, have you any comment?

DR SYLVESTER B. KELLEY: I am the one who missed the diagnosis on this woman. It was difficult for me to forget my first impression of her. She came to see me a number of years ago, complaining of intermittent bleeding, and at that time we passed a catheter 4 cm up the ureter to outline an oval shadow previously described by x-ray study. My thought was that it was a non-opaque stone. Because of economic reasons she declined an operation as long as she was not in great discomfort. However, the bleeding persisted, and she came back about the first of this year for another examination. At that time we cystoscoped her and I thought the appearance of blood clot protruding from the ureter was very unusual. It did not look like a normal blood clot but as if fibrous tissue had invaded it. In view of the negative biopsy, however, I still thought she might have a stone in the lower ureter and proceeded to operate. Through a Gibson incision we exposed the ureter, not without some difficulty because of adhesions. It was larger than the size

looking into the history, we found that it was a primary carcinoma of the colon which had been resected. She had a metastasis to the maxilla, and that was the only metastasis that she had.

DR BENJAMIN CASTLEMAN This patient now has another bone lesion.

DR F DENNETTE ADAMS Is the leukocyte count consistent, inconsistent or common in this type of disease?

DR MALLORY I do not believe it helps one way or the other.

DR SIMMONS I should think it would not be of any value unless there were an ulcerative lesion in the colon.

## CASE 25212

### PRESENTATION OF CASE

*First Admission* A seventy-one-year-old widow was admitted complaining of hematuria.

For about two months the patient had had bouts of hematuria. The amount of bleeding was not recorded. There had been no pain over the kidneys, and no dysuria except for slight discomfort about the urethral meatus during the urinary bleeding. There was slight increase in frequency, but she had nocturia only once a night. There was some discomfort low in the spine. She had not lost weight.

Five years before admission she had had a hysterectomy and an "observation" cystoscopy, which was negative. She had had no symptoms referable to the abdomen or chest and no headaches.

Physical examination showed a very obese woman in no distress. Examination of the head and chest was essentially negative. Examination of the abdomen revealed no masses or spasm. Neither kidney was palpable, and there was no tenderness.

The temperature was 99.8°F, the pulse 95, and the respirations 20.

The urine was slightly hazy but contained no albumin. There were many red cells and a rare white cell per high-power field.

An intravenous pyelogram showed a non-functioning right kidney and a normal left kidney. Parts of what appeared to be the right kidney outline were seen, it was unusual in shape and small. No calculi were visualized in the urinary tract. Cystoscopy and a retrograde pyelogram revealed a non-opaque obstruction in the lower end of the right ureter. Operation was advised but refused, and the patient was discharged on the day of admission.

*Second Admission* (three weeks later) Following discharge the patient had been very well and had had no pain. She had had hematuria on two occasions, with slight associated weakness.

Physical examination was negative, except for slight tenderness in the right upper quadrant. The blood pressure was 150 systolic, 90 diastolic.

The temperature was 98.6°F, the pulse 80, and the respirations 20.

Examination of the urine showed a specific gravity of 1.022, a slight trace of albumin, 100 red cells and 8 white cells per high-power field, and no casts. The blood showed a red-cell count of 4,000,000 with 70 per cent hemoglobin, and a white cell count of 11,700 with 67 per cent polymorphonuclears. The nonprotein nitrogen of the serum was 24 mg per 100 cc, the uric acid 5.9 mg and the protein 7.0 gm.

A retrograde pyelogram showed that the left ureteral catheter extended to the kidney pelvis. The right was obstructed 2 cm from the ureterovesical orifice. No stones were seen in this area. After injection on the right side most of the dye returned to the urinary bladder. A sufficient quantity passed up the ureter, however, to outline an oval filling defect in the ureter just above the tip of the catheter. This filling defect was about 1 cm in width and 1.5 cm in length. Its long axis was in the course of the ureter, and it had the appearance of a non-opaque stone.

On the fifth hospital day a cystoscopic examination showed an essentially normal bladder except that the intravesical portion of the right ureter was unusually enlarged and reddened. Adherent to the right ureteral orifice, which was also unusually prominent, was a large blood clot. It was impossible to pass a catheter more than 0.25 cm up from the right ureteral orifice, and dye could not be injected through it. Two days later the cystoscope was again passed, and with cystoscopic rongeurs the mass of red tissue which protruded from the right ureteral orifice was gradually dissected. It was unusually tenacious for a blood clot and a specimen was taken for biopsy. This showed acute and chronic inflammation, with hemorrhage. As soon as this mass had been removed it was possible to pass a No. 6 catheter about 0.5 cm up the right ureter, where it met obstruction. No fluid could be recovered through the catheter from this area. On the tenth hospital day an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR GEORGE G SMITH The situation here seems to be that of an elderly woman who came in with very few symptoms except recurring hematuria, a symptom that always must be taken seriously and investigated. She evidently had had very little infection because her temperature had been normal. The urine contained only a few white cells but many red cells. No tenderness



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## THE WORCESTER DISTRICT MEDICAL SOCIETY MOBILIZES

For many years all sorts of theories have been advanced and experiments made for the purpose of improving the quality and increasing the scope of medical practice which have not been approved by organized medicine, and lately, the federal government has indicated its intention to attempt a solution of the problems incident to the medical care of certain groups of the people by methods which have not been in harmony with the ideals of the profession.

The consensus of physicians is that the profession can solve its own problems and in conformity with this sentiment, the American Medical Association has suggested the study of conditions existing in counties throughout the nation in order to permit the accumulation of factual data and opinions as to details of procedure which may be applicable

to the needs of such communities, with the understanding that it may be impossible to devise one universal plan which could be made workable in all sections of the country.

A notable response to the recommendation of the American Medical Association has been the action of a committee appointed by the Worcester District Medical Society consisting of twenty-five physicians of Worcester and six nearby towns under the chairmanship of Dr. James C. McCann. Indicative of the quality of this study is the list of co-operating agencies, which include 226 physicians, 43 dentists, 14 nursing groups, 37 pharmacies, 16 hospitals, 15 departments of health, 7 educational institutions, 14 superintendents of schools, 20 boards of welfare, 29 private welfare bodies, the Young Women's Christian Association, the Worcester Girls' Club, the Worcester Employment Agency, the Worcester Swedish Girls' Club, the Society for the Prevention of Cruelty to Children, the Worcester Child Guidance Clinic and the Worcester Associated Charities. The committee made its report to the Worcester District Medical Society at the annual meeting on May 10, and it was published in the May 2 issue of the *Worcester Medical News*, the official publication of the Worcester District Medical Society.

The report concerns a population of 433,000 persons supplied with 1892 hospital beds, 450 physicians, 225 dentists, 109 pharmacies and a large corps of nurses. In this area 6304 patients during the year were referred to hospitals and clinics, and 14,941 were treated free in doctors' offices, homes and hospitals. Dispensaries and clinics gave 18,385 hours of service. In 25 per cent of 2678 deliveries by 87 physicians no fee was charged. It was estimated that 20 per cent of the service given by physicians in this region was free. Only 213 cases reported by all groups, exclusive of the school population, were reported as unable to secure needed service. This shows that those who are sick in the section under investigation are well supplied with medical care and that doctors are contributing a large proportion of time without remuneration, but it does not show why these non-paying patients are unable to pay some proportion of the doctors' fees.

of my thumb, and very much bound down as far up toward the kidney and as far down toward the bladder as I could reach. There was a small abscess in it which I opened. No stones of course were demonstrable. I called Dr. Mallory over to do a frozen section on the wall of the ureter, and he told us that it was probably carcinoma. In view of the condition locally it was unwise to remove the ureter or consider a nephrectomy, so the wound was closed.

The patient made an uneventful convalescence and is now fairly comfortable, up around the house, doing housework and not in any great discomfort. She does pass a little blood now and then, but that does not interfere with her comfort. I do not regret that I did not attempt to remove the ureter. The only further course is to give x-ray therapy if the bleeding becomes bothersome.

#### CLINICAL DIAGNOSIS

Right ureteral calculus

#### DR. SMITH'S DIAGNOSIS

Ureteral neoplasm

#### ANATOMICAL DIAGNOSIS

Epidermoid carcinoma of the ureter

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: A very considerable and diffuse enlargement of the ureter was found, as Dr. Kelley described, and sections show a very extensive, highly malignant carcinoma, apparently of the squamous-cell type. I do not believe that from the data on hand we can say whether it was primary in the ureter or had extended down from the kidney. I have not had enough experience with squamous-cell carcinoma of the renal pelvis to know whether it runs down the ureter like a papillary carcinoma. I have not seen it do so and would not expect it, but this condition is so rare that my experience is very limited.

*New England Journal of Medicine*, for May 25, 1939

- 2 Nominating Committee retires to deliberate
- 3 Reports of standing committees and special committees
- 4 Reports of committees to consider petitions for restoration to the privileges of fellowship and new committees to be appointed
- 5 Election of officers and orator by ballot
- 6 Appointment of committees for ensuing year, both standing and special
- 7 Proposed changes in by-laws
- 8 Incidental business

ALEXANDER S. BEGG, *Secretary*

Councilors are asked to sign one of the two attendance books before the meeting. The Cotting Luncheon will be served immediately after the meeting.

## ANNUAL MEETING NEWS

The Ladies' Committee for the annual meeting of the Massachusetts Medical Society to be held in Worcester, June 6, 7 and 8, is looking forward with great pleasure toward welcoming the visiting ladies.

Several interesting and enjoyable events have been planned. On Tuesday a bus will take us to the Worcester Country Club for lunch. After lunch we shall visit two very lovely gardens. Mrs. Herbert P. Emory has graciously consented to open her country estate. The wild-flower planting, shrubs and trees, together with many perennials, constitute an unusually charming garden with something of an old-fashioned atmosphere. From Mrs. Emory's we shall go to Mrs. Homer Gage's estate. Mrs. Gage is a most cordial hostess and we are indebted to her for welcoming us to her garden, famous for its iris, roses, perennials and a unique Japanese garden with a brook, bridges and a real Japanese teahouse.

Dinner has been arranged at the Worcester Club at six-fifteen Monday evening, following which we shall be welcomed at the Shattuck Lecture to be held in the Hotel Bancroft.

On Wednesday at noon a bus will take us to "The Red Barn" in old Boylston for lunch and then on to Harvard, to visit three very interesting museums "Fruitlands," the old home of the Alcott family and the cradle of the transcendentalist movement, the Shaker exhibit, complete with exhibits of their industries, ways of living and clothes, and finally, the American Indian Museum, which is considered by many the best of its kind in the country. Tea will be served at the Museum Tea Room.

In the evening we shall have the opportunity of

hearing the speakers at the annual dinner at the Hotel Bancroft.

We shall be very grateful if the women who plan to attend these events will send in their names, on the blanks which are attached to the advance programs, at the earliest possible date.

MRS. CHARLES A. SPARROW, *Chairman*

## SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

### BLEEDING IN THE PUERPERIUM

Mrs. E. P. D., a twenty-year-old gravida II, started flowing rather freely on the thirteenth day following a cesarean section.

The familial history was unimportant. The patient's previous illnesses included scarlet fever, measles, whooping cough and chickenpox. She had had rheumatic fever at the age of seven, which lasted for four months, but had had no further trouble after the removal of her tonsils. She underwent an appendectomy at the age of fifteen. Catamenia began at eleven, were regular with a twenty-eight-day cycle, but always lasting nine or ten days, with a great deal of pain on the first day. Her last period was September 20, 1934, making the expected date of confinement June 27. The previous pregnancy in November, 1933, had resulted in a dead baby following version after an unsuccessful attempt at forceps delivery.

The present pregnancy had been uneventful. Physical examination was normal, her highest blood pressure was 118 systolic, 75 diastolic, and she had gained 20 lb. A cesarean was elected on June 22 because of the previous history and because the presenting part was not engaged and the child was estimated to be larger than 8 lb. The baby weighed 8 lb. 9 oz.

The convalescence was uneventful until the thirteenth day when she began to flow very freely after she had been up. The blood examination six days after operation showed a red-blood-cell count of 3,920,000 and a hemoglobin of 73 per cent. The day after the first bleeding the red-cell count was 3,100,000, and the hemoglobin 65 per cent. There was a moderate amount of bleeding for several days after the initial hemorrhage, each day small clots, the size of a walnut, were passed and four to five pads were moderately saturated. The

\* A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

As one reads the report the impression is gained that any inadequacies of medical care could be overcome if reported to the proper authorities and requests made for the formation of plans for the payment of doctors' charges from tax funds. One significant opinion expressed in this report is that higher quality of service will be secured for the indigent if the free choice of the physician is assured and if the payment of the doctor at established rates from tax funds is made. The large number of defects found among the school population is explained by the ignorance and apathy of parents, and it is pointed out that the medical profession should have the facts reported to the proper authorities.

In dealing with the problems of the low-income group, some form of voluntary insurance is recommended, and in order to develop efficiency in carrying forward the necessary administrative and correctional procedures, elaborate details of organization are set forth.

Taken as a whole, this report is an illuminating compilation of factual data, with sound conclusions and recommendations of procedure, and reflects credit on the committee which has the honor of presenting the first report to a district society in Massachusetts and through this channel to the Massachusetts Medical Society.

The Worcester District Medical Society accepted the report and voted to authorize its president to appoint a continuing committee for further study and such action as may be indicated.

The next question is, What will come of it? Will it be pigeon-holed as an example of work well done, or will it stimulate a determination to carry forward permanent working organizations designed to solve the questions before the profession and the public? Here is an opportunity to demonstrate the ability of the profession to assume leadership in bringing order out of a complicated situation.

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#### NATIONAL TUBERCULOSIS ASSOCIATION MEETING IN BOSTON

SINCE its foundation in 1904, the National Tuberculosis Association has met in Boston only once,

in 1918, and we take this opportunity to welcome the Association to Boston for its thirty fifth annual meeting.

The National Tuberculosis Association, organized and maintained by public-spirited laymen and physicians and supported by funds derived from the sale of Christmas Seals, is one of the largest and most important voluntary associations in the United States. Its chief objects are to promote the investigation of tuberculosis, to disseminate information to the medical profession and the lay public concerning the prevention and control of the disease and to arouse concerted community action against it.

There has been a consistent decline in the death rate from tuberculosis in the United States—from a rate of nearly 200 per 100,000 population in 1900 to a probable rate of below 50 for the year 1938. This favorable trend may in part be ascribed to the educational influence of the Association and its numerous affiliates. The promotion of case-finding and the encouragement of adequate hospitalization of the tuberculous throughout the country are important factors.

The program of the annual meeting is published elsewhere in this issue of the *Journal*. The meetings are open to all. Physicians are especially welcome and may avail themselves of this opportunity to become familiar with advances in the study of tuberculosis and allied problems by attending the conference.

The medical clinics at local hospitals on Wednesday afternoon are featured for the first time during a meeting of the Association. As the seating capacity is limited, tickets should be secured in advance.

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#### MASSACHUSETTS MEDICAL SOCIETY

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#### ANNUAL MEETING OF THE COUNCIL

The annual meeting of the Council will be held on the stage of the Municipal Memorial Auditorium, Worcester, on Wednesday, June 7, at 10.30 a m.

#### *Business*

- 1 Presentation of record of special meeting held April 26, 1939, as published in the

*Obstetrics Management of abnormal presentations*  
Norris H. Robertson, Keene.

11.30 a m

## ROUND TABLE CONFERENCES

*Medicine Backache* Jeremiah J Morin, Rochester  
*Surgery Hernia* James B Woodman, Franklin  
*Eye Abnormal position of the head due to ocular disturbances* Alfred Bielschowsky, Hanover  
*Birth Control Indications for and techniques of contraception* Eric M Matsner, New York City

2 00 p m.

*Symposium on Neurology*

- a. *Treatment of Epilepsy and Migraine* William G Lennox, Boston
- b. *Neurosyphilis and Its Treatment* H Houston Merritt, Boston.
- c. *Treatment of Paralysis Agitans and Athetosis* Tracy J Putnam, Boston.

*Proctologic Problems of the General Practitioner and the Surgeon* Louis A Buie, Rochester, Minn

\* \* \*

FRIDAY, JUNE 9

9 30 a. m. D.S.T

## ROUND TABLE CONFERENCES

*Medicine Home deliveries in rural sections* Forrest B Argue, Pittsfield.  
*Surgery Methods of urography* John P Bowler and Leshe K. Sycamore, Hanover  
*Anesthesia Some misadventures of anesthesiology* A Frederick Erdmann, Lisbon.  
*Nose and Throat Diseases of the nasopharynx* Adolphe J Provost, Manchester

11:00 a. m.

*Introduction of Visiting Delegates*

*Medical Problems of the Day* Rock Sleyster, Wauwatosa, Wisconsin, *president*, American Medical Association.

2 00 p m

*Report of House of Delegates**Report of Trustees*

*The Development of Socialized Pharmacy in the United States* George A. Moulton, Peterborough  
*Clinical Phases of General Surgery* W Wayne Babcock, Philadelphia

*Control of Syphilis* Raymond A Vonderlehr, Washington, District of Columbia, Assistant Surgeon General, United States Public Health Service.

6 30 p m

## THE BANQUET

*Introduction of President Elect**Guest Speakers*

Dr Clarence O Coburn, *president* New Hampshire Medical Society

Hon Charles W Tobey

Dr Rock Sleyster, *president*, American Medical Association

*Coburn's Canaries**Manchester String Ensemble*

## MISCELLANY

## THE COMMITTEE OF PHYSICIANS

The following abstract of a statement issued by the Committee of Physicians for the Improvement of Medical Care, Incorporated, has been recently released.

\* \* \*

The members of the committee have embarked on the second phase of its work, the critical analysis of general or national movements toward the reorganization of medical care. It is their intention to subject to scrutiny and to expose to the light of public opinion and more especially to the physicians of this country, projects or actions of government or of organized medical or lay groups.

They have felt constrained to adopt an uncompromising attitude toward projects or measures that obviously violate the fundamental ends for which they have united, namely the protection and improvement of the quality of medical care. But they are equally solicitous that no systems be imposed of such uniform and stereotyped patterns that experiment and evolutionary development will be deterred. In fact, they have proclaimed interest in education and investigation, establishment, maintenance and improvement of standards of competence and merit, the need for expert control, all features that are incompatible with static uniformity.

## THE WAGNER BILL AND ITS IMPLICATIONS

The introduction of the Wagner Bill will undoubtedly accelerate movements that have already begun to initiate projects and to promote legislation dealing with the reorganization of medical services. It is therefore imperative that some attempt be made by the medical profession to develop a constructive point of view in order to protect the best interests of physicians and patients before legislative action is consummated.

In the present statement about the Wagner Bill, attention is confined chiefly to those provisions which, in the opinion of the committee, should be modified or implemented if legislation, under the terms of this bill, is to improve the quality, and, not merely to increase the quantity, of medical care.

*Administrative Authority*

This committee has, in the past, repeatedly asserted that the various departments of the Federal Government, having to do with health, should be consolidated. The advantages of co-ordinated action have been well illustrated by the effective work of the Interdepartmental Committee and its Technical Committee. Similar co-ordination would seem to be essential to the success of a comprehensive health program. It is therefore urgently recommended that all titles except XIV, which deals with disability benefits, be placed under a single authority, to be established.

*Advisory Bodies*

It would be advisable to have under both federal and state authorities, central advisory councils to promote the integration of the program as a whole. It may be nec-

treatment was entirely conservative, oxytocics and rest in bed being prescribed. The red-cell count five days after the original bleeding had increased to 4,600,000, and the hemoglobin to 78 per cent.

**Comment** Routine examinations of the blood before operation are very helpful in determining the amount of blood that is lost during and after operation. The same is true of blood examinations before delivery, early in the puerperium and following any hemorrhage that may subsequently occur.

The drop in this case was not serious, as the red-cell count only went down to 3,100,000 and the hemoglobin to 65 per cent. In spite of hemorrhage which seemed rather alarming, the blood examination showed that the loss was not serious. One should hesitate a little bit more about entering a uterus that bleeds after cesarean section than one does with a uterus that bleeds after normal labor, but conservatism in treating these cases should not be carried too far. Blood examinations furnish intelligent checks. In this case, if the blood picture had shown a marked secondary anemia or if subsequent hemorrhage had occurred, the uterus of necessity would have had to have been invaded, for in no other way can such hemorrhage be controlled.

## DEATHS

**BROWN**—HARRY BROWN, M.D., of Cottage Street, Whitinsville, died May 7. He was in his sixty-ninth year.

Born in Somersworth, New Hampshire, he attended St. Paul's School and Governor Dummer Academy. He received his degree from the University of Vermont College of Medicine in 1895. Dr. Brown also attended the Massachusetts Institute of Technology and had received training in several New York City hospitals, at one time he was connected with the Sing Sing Prison Hospital in Ossining, New York. He was formerly affiliated with the Massachusetts General Hospital, and he had practiced medicine in Boston before going to Whitinsville.

His fellowships included those in the Massachusetts Medical Society and the American Medical Association.

His widow, a daughter and a grandson survive him.

**La FORTUNE**—WILFRED T. La FORTUNE, M.D., of Fairmount Place, Fitchburg, died May 8. He was in his fifty-third year.

Born in Adams, he graduated from the University of Maryland, and received his degree from the Baltimore Medical College in 1910. After serving his internship at the Maryland General Hospital he started practice in Fitchburg in 1911. For twenty-two months he served in the United States Army during the World War.

He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow and two sisters survive him.

**LOWELL**—ALBERT F. LOWELL, M.D., of Gardner, died May 14. He was in his sixty-fifth year.

Born in Burlington, Vermont, he received his degree

from the University of Vermont College of Medicine in 1900, and had practiced in Gardner since 1901.

Dr. Lowell had been senior surgeon of the Henry Heywood Memorial Hospital and consulting surgeon at the State Hospital for the Insane at East Gardner, the Templeton Branch of the Walter E. Fernald School and the Peterboro (New Hampshire) Hospital. For a long time he also served as surgeon for the Boston and Maine Railroad.

His fellowships included the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons. He was a member of the Massachusetts governing board of the Gorgas Memorial Institution, and from 1910 to 1921 was associate medical examiner in the second Worcester district.

**MYRICK**—ALFRED W. MYRICK, M.D., of North Main Street, Randolph, died May 10. He was in his fifty-sixth year.

Born in Kingston, he received his degree from Tufts College Medical School in 1909. Dr. Myrick had practiced in Randolph for twenty-five years and served as a captain in the medical corps during the World War.

He was a fellow of the Massachusetts Medical Society and of the American Medical Association.

His widow and a brother survive him.

## NEW HAMPSHIRE MEDICAL SOCIETY

### ONE HUNDRED AND FORTY EIGHTH ANNUAL MEETING

HOTEL CARPENTER, MANCHESTER, N. H., THURSDAY AND FRIDAY, JUNE 8-9, 1939

WEDNESDAY, JUNE 7

7:30 p. m. D. S. T.

#### HOUSE OF DELEGATES

*Speaker*, William J. P. Dye, Wolfeboro  
*Vice speaker*, Fred Fernald, Nottingham.

#### Delegates from New England Societies

*Maine* George L. Pratt, Farmington.

*Vermont* Wayne Griffith, Chester

#### Massachusetts

Edward A. Adams, Fitchburg  
Thomas R. Donovan, Fitchburg

#### Rhode Island

Philip Batchelder, Providence.  
Orland Smith, Pawtucket.

#### Connecticut

Thacher W. Worthen, Hartford.  
Paul R. Felt, Middletown.

\* \* \*

THURSDAY, JUNE 8

9:30 a. m. D. S. T.

#### ROUND TABLE CONFERENCES

*Medicine* Use and abuse of the pituitary sex hormones  
Loren F. Richards, Nashua.

*Surgery* Common fractures Daniel J. Sullivan, Manchester

*Pediatrics* Pulmonary infections in childhood MacLean J. Gill, Concord.

pensation of medical care. They cannot, however, expect to arrogate to themselves control of all ancillary services, nor can they deny some voice in the plan to those for whose benefit their services are intended.

Every encouragement should be given to the development of voluntary sickness insurance. Although it cannot be expected to solve all the medical problems of those just above the level of true need, it will assist many to meet their financial obligation.

If hospital insurance is to function widely there must be sufficient well-equipped hospitals, open to all citizens and available to all the doctors of a community for the care of their private patients, subject to standards of competence and merit.

It is highly desirable that hospitals become increasingly the central foci of medical care in their communities. To this end, opportunities should be given for wider participation of the medical profession in the hospitals and clinics.

The separate treatment of each component of health services can only result in multiplication of administrative machinery and discoordination of instrumentalities for the dispensation of care. If, for example, insurance for medical services cannot be entrusted to the agencies that now control insurance for hospitalization, efforts should be made to find more satisfactory governing bodies not to keep two types of insurance which serve a common purpose separated. It is to the interest of both the public and the medical profession that as little as possible of the funds allocated to medical care be diverted for administrative purposes.

A complete plan for voluntary prepayment for medical care must provide all the essential components of medical care. The service offered under this system cannot be allowed to fall below the standards which have been discussed as essential for public medical care of the needy.

Those with family incomes of \$800 to \$1200 (roughly the middle third of our population) can hardly be expected to avail themselves generally of insurance at a cost of 6 to 8 per cent or more of the total family income. The necessities of life at these income levels are too precarious. The economic level at which insurance of this kind especially on a voluntary basis, can become generally operative is probably higher.

There is much evidence that payment on a per capita basis in proportion to the number of patients served or by salary is superior to payment on a fee for service basis. Group medical practice facilitates the operation of these plans. Programs, to be adequate, must at least include devices for the correlation of services, the co-operation of physicians and the economic and efficient utilization of diagnostic and therapeutic facilities.

#### *Compulsory Government Health Insurance*

The opinion has been expressed, with evidence to support it, that voluntary prepayment systems will not solve completely the medical problems of the marginal group just above the level of need (below \$1200 per family per annum, for example), because the costs exceed the financial capacity of these people. Unless the institution of a universal or nearly universal tax supported system is contemplated, care cannot be given to the group between the self supporting and the needy without some form of supplementary support. Excessive fees from the well-to-do, by which physicians have been wont to reimburse themselves for their philanthropies, must diminish steadily as voluntary insurance spreads. Moreover if physicians are to be remunerated for their services to the needy, it would seem illogical that they should offer gratuitous service to those above the level of need. To neglect the

intermediate group while providing for their more indigent fellows, seems equally inconsistent. It seems clear that the needs of this group can be met completely only by supplementary payments from private or public funds on an insurance basis or by a completely tax supported system.

In spite of these arguments, the committee views with disfavor any attempt to introduce compulsory health insurance widely at this time. If this system of payment for medical care is eventually to be adopted in this country, experimentation is advisable to discover formulas that will avoid the errors of European systems. Whether or not we are favorably inclined to the principle of compulsory health insurance, it is the part of wisdom to establish in advance the general principles which should govern such projects. In most essentials these do not differ from those that have been prescribed for the program for care of the needy.

One great danger to be feared is too niggardly estimation of costs. All available precedents indicate that even the most efficient non-profit groups cannot operate at a cost as low as that set by the government.

In no case can programs be allowed to offer care with quality proportioned to income.

#### *Group Organizations*

Group medical practice, if properly organized at the initiative of physicians or consumers, favors the full utilization of services of specialists and consultants, efficiency and economy in the use of time and facilities and the development of institutions and organizations which will facilitate administration of medical care. It fosters education by mutual contacts between physicians with various training and skills. By centralizing activities and economizing time, it provides to the professional participants leisure for self improvement and productive efforts. By effecting economies in administration and physical appurtenances, it permits a larger proportion of total income to be used for remuneration of personnel and enlargement of resources and facilities.

#### *Disability Benefits*

It is quite proper that the government refuse to underwrite disability benefits unless it is assured that serious efforts will be made to minimize the incidence and duration of disability.

#### *Education and Investigation*

The bill neglects entirely provisions for the support of general education and investigation. The committee can not too emphatically insist that without such provisions no program that contemplates expansion and improvement of medical care can be considered satisfactory or complete.

#### THE COMMITTEE OF PHYSICIANS FOR THE IMPROVEMENT OF MEDICAL CARE, INC.

Richard M. Smith	Channing Frothingham
(president)	H. Rawle Geyelin
Hugh Cabot	F. T. H. Doubler
William J. Kerr	L. Emmett Holt, Jr.
(vice presidents)	William S. Ladd
Russell L. Cecil	H. Clifford Loos
(honorary chairman)	Harry S. Mackler
George Blumer	William S. McCann
Philip King Brown	T. Grier Miller
Allan M. Buder	George R. Minot
Louis Casamajor	Hugh Morgan
Thomas B. Cooley	Robert B. Osgood
J. Rosslyn Earp	LeRoy S. Peters

essary to establish, under these central councils, expert bodies of a similar nature to deal with special aspects of the program.

These councils should contain representatives of all professional groups concerned. The medical delegation should include representatives from educational and scientific organizations or institutions. It may be necessary or advisable to add lay representatives to present the case of the consumer and the taxpayer. But representation of special interests should be subordinated to the more important point of assembling outstanding persons with imagination, intelligence, expert knowledge and critical judgment.

### *Medical Care for the Medically Needy*

**General Organization** Public health services for all groups of the population should be placed under the control of trained, expert, salaried full time officers selected on the basis of merit.

**Qualifications Under the Means Test** If a program to provide care for the medically needy is to function, it must be predicated upon the total population requiring service, with payment estimated on a per capita basis (This was the principle of the Technical Committee's Proposal 3). If expenditures are contingent upon illness, there will be a tendency to reduce services to a minimum and to impose obstacles to qualifications. The objective should be to provide care for all those that require it, not merely for those who demand it. Some system will have to be devised for the registration of those entitled to tax supported care. But methods must be found whereby they may be qualified with expedition and without indignity.

**The Components of Medical Care** This committee has already declared that programs should include all the necessary components of medical care (1) adequate public-health services, (2) services of a general practitioner, (3) services of specialists and consultants, (4) access to modern diagnostic and therapeutic facilities, (5) provisions for hospitalization.

There must, of necessity, also be some machinery to integrate and correlate these components.

**Hospitals and Health Centers** The Wagner Bill proposes new expenditures for hospitals and health centers. There can be no doubt that there is need for further institutions of this kind. However, every effort should be made to utilize to the utmost private and public facilities that are already available.

In order that existing institutions may become eligible for government aid, they should be properly equipped to provide the services for which they are intended.

The hospitals must be staffed by qualified physicians and surgeons, and no person should be allowed to assume professional obligations for which he has not demonstrated competence. Standards similar to those of the American boards for certification of physicians as specialists might be established.

If standards of competence are established as qualifications for appointment to the staff of these hospitals and centers, every effort should be made to permit those who can meet these qualifications to participate in the activities of these hospitals and centers and to utilize their facilities. Under the present system, in many communities throughout the country, highly competent young surgeons and specialists are excluded from the local hospitals which, although presumably quasi public, philanthropic institutions, are controlled by small groups of physicians and surgeons, virtually as personal vested interests. This tends

to impair their educational value, to deter physicians from taking full advantage of their facilities, and discourages highly trained men from establishing themselves in practice in these communities.

Special consideration should be given to large general hospitals and teaching institutions, which may require treatment different from that accorded to small community hospitals.

No grants-in aid should be permitted to go to the support of hospitals or other organizations which are conducted as proprietary institutions for private gain. In institutions which are for both needy and self supporting patients, a system of cost accounting which separates expenditures for the two categories must be required.

**Correlation of Services** If the program is to provide all the necessary components of medical care, some means must be provided by which these may be co-ordinated. This purpose is peculiarly well served by group medical practice, properly organized at the initiative of physicians or consumers. Such group activities for the care of the needy could well be centered about hospitals and diagnostic and therapeutic centers. Full correlation with existing public health services must also be provided.

**Estimates of Cost** Experience of non profit organizations already engaged in providing medical services indicates that, under private auspices, full medical care of acceptable quality costs more than \$20—possibly nearer \$30—per capita per annum. In the proposal of the Technical Committee for medical care of the needy, however, expenditure of only \$10 per capita is proposed. No consistent and comprehensive program can depend on the uncontrollable vagaries of philanthropy.

The \$10 per capita is presumably expected to meet costs of administration, hospitalization, personal services including those of physicians, and the cost of all appurtenances required for the proper dispensation of medical care. The public will be in no position to demand efficiency and competence if it will not pay for them. The fixed expenses for physical equipment and administration in such a program are least susceptible of reduction. Without physical equipment, any program will be ineffective because it will provide only exposure of patients to physicians. Physical facilities will be equally useless unless there is some inducement to physicians to utilize them. In some of the government programs already in effect, the most exemplary institutions have been unable to participate because allotments under grants-in aid have been too small to meet the costs of service without some sacrifice of quality.

To embark upon a program that contemplates the expenditure of only \$10 per capita per annum, when this is obviously inadequate, would inevitably sacrifice quality to mere distribution.

### *Voluntary Prepayment for Medical Care*

Obviously no plan can work without the co-operation of physicians and other professional experts, no plan can work well that does not offer opportunities and incentives to these professionals. On the other hand, if the operation of the plan does not benefit the consumers or recipients of medical care, it has not accomplished its purpose. If all parties concerned were to direct their concerted efforts toward the development of programs that would assure the highest quality of care, it should be possible to find formulas for the distribution of authority and for the solution of administrative problems, the two greatest sources of difference of opinion. Physicians cannot be robbed of their natural monopoly of the dis-



Convention, I hereby invite the several bodies entitled under the constitution to representation therein to appoint three delegates and three alternates to the Convention for the Revision of the *Pharmacopoeia of the United States of America* which is to meet in Washington, District of Columbia, on May 14, 1940

Under the Federal Food, Drug, and Cosmetic Act the standards of strength, quality and purity laid down in the *Pharmacopoeia* for the drugs and preparations that it recognizes become the legal standards for such drugs and preparations. As a consequence the manufacturer, the dispensing pharmacist and the physician have a common interest in the *Pharmacopoeia*. The manufacturer is enabled to furnish the pharmacist with officially standardized materials, the pharmacist to dispense, with exactitude, just what the physician desires, and the physician to write his prescriptions in simple terms with confidence in what the pharmacist will dispense. Without the *Pharmacopoeia* there would be chaos. Without confidence in its sponsors the situation would be perilous.

The Convention for the Revision of the *Pharmacopoeia* decides the principles under which the *Pharmacopoeia* is to undergo revision. It also elects the officers of the Convention, Board of Trustees to manage administrative legal and financial matters, and a Committee of Revision, all to serve until the next convention meets.

The Committee of Revision is composed of fifty elected members. Seventeen of these are doctors of medicine representatives of clinical medicine, pharmacology, serology, therapeutics, and so forth. The other thirty-three members belong to pharmacy and the allied sciences, and include representatives of dispensing and manufacturing pharmacy, inorganic and organic chemistry, botany pharmacognosy, biological assay, and so forth.

In the past, the Committee of Revision has included men of the highest rank in the several fields. That it may continue so to do, it is asked that the various bodies authorized to send delegates to the Convention will appoint their full quota of delegates, and will select them from among those of their own people whom they know to be informed and at the same time prepared to attend the Convention.

WALTER A. BASTEDO, M.D., *President*

United States Pharmacopoeial Convention

33 East 68th Street,  
New York City

## REPORT OF MEETING

### SUFFOLK DISTRICT MEDICAL SOCIETY

At a meeting of the Suffolk District Medical Society at the Boston Medical Library, on Wednesday evening January 25, a discussion of recent progress in diabetes was arranged by Dr. E. P. Joslin. Dr. Albert Hornor turned over the chairmanship to Dr. J. P. Monks.

The first paper was presented by Dr. E. P. Joslin "Resume of the Diabetic Situation Here and Elsewhere." He stated that a survey of diabetic deaths by Dr. George W. Lynch has shown that good progress is being made in the treatment of diabetes in Boston. General practitioners are advised to keep in close contact with their patients who have been referred to hospitals, since 165 out of 301 diabetic deaths in 1935 occurred in hospitals. Laboratories are at present well equipped and open day and night for blood analyses. At the Children's Hospital there have been no deaths from diabetic coma since the discovery of insulin. Furthermore, the surgeons are to be

complimented on their record in caring for surgical complications. In the Boston area there are 8000 known diabetic patients and probably as many unknown. In Norway there are half as many. Massachusetts leads the world in the number of such patients. The true incidence of diabetes has not increased, although the gross incidence has, the reason for this is the increased longevity of the population.

Dr. A. P. Joslin presented the second topic "Treatment with Diet and Protamine Zinc Insulin in Hospital and Home." Dr. Joslin emphasized the change in methods of treatment. Whereas the old method was to treat patients for a few months or a year, modern doctors plan treatment to last twenty or forty years. Surveys have shown that 48 per cent of present-day diabetic patients do a full day's work, and another 25 per cent do a three-quarter day's work. In young adults the problem is how to guide the rest of their lives. A good principle to remember is that severe cases rigorously treated often become mild. The essence of treatment is management of the diet. Carbohydrate should be limited to 150 or 200 gm., protein governed by the age of the patient, and fat supplied to provide good balance. Protamine zinc insulin should be begun early, and its administration should be given at an optimum time to be carefully balanced by a proper distribution of carbohydrate ingestion and to be supplemented, if necessary, by regular insulin. The blood sugar curve should fluctuate between 100 and 200 mg. per 100 cc. Patients should be instructed in groups since by this method a kindly companionable spirit of encouragement will prevail and will be of great help to the new patients. It is the careless patient who is difficult to treat. All patients should be constantly reminded that it is cheaper to stay well than to get well. Voided urine specimens are to be carefully watched for glycosuria each day. Dr. Joslin stated that protamine zinc insulin has marked advantages over regular insulin, it is cheaper, allows a life less mindful of the disease and is safer to use.

The third paper was presented by Dr. Henry Baker, in collaboration with Dr. Alexander Marble. Hypoglycemia. Dr. Baker began the discussion. Hypoglycemia is either spontaneous or due to insulin overdosage. Although insulin shock has been used with some success in the treatment of psychoses, one must remember that damage and death are possible sequelae. Usually it is multiple doses that lead to death. A case record was cited for illustration. The patient at autopsy showed marked atrophy of the pancreas which contained many stones, edema of the brain and diffuse capillary hemorrhages. The patient's doctor had given her several doses of insulin under the impression that her symptoms of nervousness were due to the diabetes and not to the early morning hypoglycemia. He should have obtained repeated voided specimens to test for sugar, he actually obtained none. The ferric chloride test is a simple and quick guide of acidosis.

The difference between the shock induced by protamine-zinc insulin and regular insulin is clinically apparent. Whereas the reaction to the latter comes very suddenly in three to four hours and with prodromal symptoms, with the former the reaction comes gradually in twelve to twenty-four hours. The symptoms in regular insulin shock are tremor, sweating and hunger. In the other they are nausea, vomiting, malaise and mental disturbance. As for antidotes, glucose is very effective, but unlike its immediate effect in regular insulin shock, repeated doses may be necessary and the outcome may be doubtful in reactions due to protamine zinc insulin.

Dr. Marble continued the discussion. He stated that the

G Canby Robinson  
David Seegal  
John H Stokes  
S Borden Veeder

James J Waring  
Mortimer Warren  
Soma Weiss  
M C Winternitz

JOHN P PETERS, M.D., *Secretary*

## ANNUAL PRIZE SUBSCRIPTION

The annual prize subscription offered by the *New England Journal of Medicine* for the best undergraduate contribution to the *Tufts College Medical Journal* has been awarded to Abraham Pollen '40 for his paper 'Present Status of Vitamin B<sub>1</sub> Deficiency,' which appeared in the March, 1939, issue. Honorable mention goes to Stanley L. R. Robbins '40 for his article 'Mode of Action of Therapeutic Agents in Thyroid Disease' in the January, 1939, issue.

## 'YOUR HEALTH' BROADCASTS

The next series of 'Your Health' broadcasts, sponsored by the American Medical Association and the National Broadcasting Company and heard over the Blue Network each Wednesday at 2 00 p m, is entitled 'Using Health Knowledge.' It consists of four broadcasts as follows:

### May 31 Checking Up on Health

Periodic health examination and what follows, and why

### June 7 Vacations—Why and How

Making the vacation a real contribution to health and recreation.

### June 14 Never Stop Learning

A new phase of life begins at commencement, and health contributes to success

### June 21 Answering Your Questions

What kind of health questions can be answered and what kind can't without seeing the patient.

## NOTES

The following thirty three appointments to the teaching and research staff of the Harvard Medical School, effective at the beginning of the next academic year, have been recently announced: Halvor N Christensen, Cozad, Nebraska, S.M. Purdue '37, teaching fellow in biological chemistry, William McL. Wallace, now at Robert Packer Hospital, Sayre, Pennsylvania, M.D. Pennsylvania '38, research fellow in biological chemistry, Kenneth E Livingston, Portland, Oregon, A.B. Stanford '36, research fellow in medicine, Frank P. Dawson, now at Middlesex County Sanatorium, Waltham, Massachusetts, M.D. Tufts '31, assistant in medicine, Herbert J. Fox, now at Boston City Hospital, M.D. Duke '35, assistant in medicine, Wallace C. Miller, now at Peter Bent Brigham Hospital, Boston, M.D. Loyola '36, assistant in roentgenology, Lewis T. Stoneburner, 3d, now at Boston City Hospital, M.D. Medical College of Virginia '37, assistant in medicine, Robert Talkov, Dorchester, M.D. Tufts '37, assistant in medicine, Paul B. Beeson, now at Hospital of the Rockefeller Institute for Medical Research, New York City, M.D. C. M. McGill '33, research fellow in medicine, Alexander M. Burgess, Jr., Providence, Rhode Island, now at Boston City Hospital, M.D. Harvard '37, research fellow in medicine, Albert H. Coons, Gloversville, New York, M.D. Harvard '37, research fellow in medicine, Charles P. Emerson, Jr., Indianapolis, now at Boston City Hospital, M.D. Harvard '37, research fellow in medicine, Florence W. Haynes, Boston, Ph.D. Radcliffe '33, research fellow in

medicine, Francis C. Lowell, Cambridge, Massachusetts, M.D. Harvard '36, research fellow in medicine, Charles H. Rammelkamp, now at Barnes Hospital, St. Louis, M.D. Chicago '37, research fellow in medicine, Otto Schales, Brookline, Massachusetts, Ph.D. Frankfurt '35, research fellow in medicine, Francis M. Forster, now at Pennsylvania Hospital, Philadelphia, M.D. Cincinnati '36, assistant in neurology, Ellsworth H. Trowbridge, now at Boston Psychopathic Hospital, M.D. Washington University '36, assistant in neurology, Howard E. Weatherly, now at Boston Psychopathic Hospital, M.D. Iowa State '34, assistant in psychiatry, Samuel P. Hunt, now at St. Elizabeth's Hospital, Washington, District of Columbia, M.D. Columbia '37, research fellow in psychiatry, Leo J. McDermott, Portland, Maine, now at Children's Hospital, Boston, M.D. Harvard '34, assistant in orthopedic surgery, Glidden L. Brooks, Lincoln, Nebraska, now at Children's Hospital, Boston, M.D. Harvard '37, assistant in pediatrics, Charles H. Cutler, now at Children's Hospital, Boston, M.D. Southern California '38, assistant in pediatrics, Harry Shwachman, Roxbury, M.D. Johns Hopkins '36, assistant in pediatrics, Fe del Mundo, Boston, M.D. University of the Philippines '33, research fellow in pediatrics, James B. Blodgett, Detroit, now at Peter Bent Brigham Hospital, Boston, M.D. Harvard '36, assistant in surgery, James B. Campbell, Jamaica Plain, M.D. Harvard '35, assistant in surgery, John H. Crandon, Boston, M.D. Harvard '37, assistant in surgery, Dean W. Tanner, Layton, Utah, now at Peter Bent Brigham Hospital, Boston, M.D. Harvard '35, assistant in surgery, Richard H. Thompson, Boston, M.D. Harvard '34, assistant in surgery, John A. Sandmeyer, Buhl, Indiana, M.D. Harvard '37, Arthur Tracy Cabot Fellow in Surgery, George H. Acheson, Pittsburgh, M.D. Harvard '37, instructor in physiology, Abe Ravin, Denver, M.D. Colorado '32, research fellow in physiology. The following five appointments hold in the Harvard School of Public Health: Francis S. Cheever, Wellesley, M.D. Harvard '36, assistant in bacteriology, Vlado A. Gettung, Pittsburgh, now at State House, Boston, M.D. Harvard '35, research fellow in preventive medicine and epidemiology, Stafford M. Wheeler, Acoaxet, Massachusetts, now at Johns Hopkins Hospital, Baltimore, M.D. Harvard '37, assistant in preventive medicine and epidemiology, James W. Hawkins, Coeur d'Alene, Indiana, M.D. Harvard '35, Charles Follen Folsom Fellow in Preventive Medicine, Ralph H. Heeren, now at University of Iowa College of Medicine, Iowa City, Iowa, M.D. University of Iowa '34, research fellow in preventive medicine and epidemiology. In addition, Spiros P. Sarris, Lowell, now at Massachusetts General Hospital, M.D. Harvard '36, was appointed assistant in surgery at the Harvard Medical School, effective January 1, 1940.

Dr. Emanuel B. Schoenbach, of New York City, has been awarded the Edward Hickling Bradford fellowship for medical research in the laboratories of bacteriology at the Harvard Medical School from January 1 to September 1, 1940. He received his S.B. from Harvard in 1933 and his M.D. in 1937.

## CORRESPONDENCE

### PHARMACOPOEIAL CONVENTION

To the Editor: I have recently issued the following call for the Convention for the Revision of the *Pharmacopoeia of the United States of America*:

In compliance with the provisions of the constitution and by laws of the United States Pharmacopoeial

and 3 miscarried. In the 9 cases, progressive toxemia was the rule in all except 1 which showed a spontaneous rise in estrin values. This suggested the method of treatment applied to the third group of 8 patients, in whom the prolactin values had risen. They were given estrin and progesterone intramuscularly, the result being that none miscarried or developed pre-eclampsia. There were seven fetal deaths, 6 in the second group, an incidence of 50 per cent, and 1 in the first group, an incidence of 8 per cent. There was no infant mortality in the group treated with estrin and progesterone. The treatment consisted of 150,000 to 300,000 international units of estrin and 10 to 20 mg. of progesterone, given until the prolactin values began to decline and then reduced in proportion to the decline in prolactin. However, the cost of this was thirty to forty dollars a day per patient! The past histories of the patients in the third group were significant in that 4 had had previous stillbirths, 3 had had normal births and 1 had had a living child born four years before the onset of her diabetes.

Dr E. P. Joslin concluded the program with a discussion of the subject, "The Emphasis Shifts from Treatment to Prevention and Early Detection of Diabetes." Modern treatment is good, and even coma is fairly well managed, but preventive action is poor. Besides putting greater emphasis on earlier diagnoses, one should consider the problem of heredity in diabetes since it is fundamental. Laws against marriage are obviously impossible, however, those with diabetes should be urged to marry non-diabetic individuals. Pincus and White have stated that by computation one out of four of the population is a carrier for diabetes.

Dr Joslin had passed out ballots to the audience, to be filled in with respect to diabetic heredity. He announced that at a gathering of 200 in Philadelphia 30 per cent had had a positive heredity, in Maine, 25 per cent, and in Omaha, 27 per cent. At this meeting the incidence was 35 per cent.

## NOTICES

### CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Lowell	June 2	Albert H. Brewster
Salem	June 5	Harold C. Bean
Haverhill	June 7	Arthur T. Legg
Gardner	June 13	Mark H. Rogers
Worcester	June 16	John W. O'Meara
Pittsfield	June 19	Francis A. Slowick
Springfield	June 21	Garry deN. Hough, Jr.
Brockton	June 22	George W. Van Gorder
Fall River	June 26	Eugene A. McCarthy
Hyannis	June 27	Paul L. Norton

### NORFOLK SOUTH DISTRICT MEDICAL SOCIETY

The Norfolk South District Medical Society will conduct its annual outing and dinner on Wednesday, June 14, at the South Shore Country Club in Hingham.

Golf for both gentlemen and ladies will start at one o'clock. Those not wishing to play golf may join the ladies at bridge or contract at two-thirty. Tea will be served at four o'clock. Dinner will be served at seven o'clock and will be accompanied by dancing, entertainment, moving pictures and the awarding of prizes. Dr. James M. Ward is the general chairman.

### BOSTON DOCTORS' SYMPHONY ORCHESTRA



*Nicolas Slonimsky*

Rehearsals of the newly organized Boston Doctors' Symphony Orchestra, conducted by Nicolas Slonimsky, are held every Thursday evening at 7:30 at Hampton Court Hotel, 1223 Beacon Street, Brookline.

Membership is still open. All physicians, dentists and medical and dental students who are interested should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

### NATIONAL TUBERCULOSIS ASSOCIATION

The thirty-fifth annual meeting of the National Tuberculosis Association will be held in Boston on June 26, 27, 28 and 29. All the meetings, except the clinics as indicated, will be held at the Hotel Statler. The sessions are open to any physician, and Dr. Chesley Bush, president of the Association, extends a cordial invitation to those readers of the *Journal* who are interested. Attention is called to the limited seating capacity at the various medical clinics, to which admission will be by ticket only. There will be no registration fee.

Those parts of the program that appear to be of interest to the physician and laboratory worker are given below.

\* \* \*

#### OPENING GENERAL MEETING

Monday, June 26, 8:15 p. m.

Address of the President. Chesley Bush, M.D., Livermore, California.

Report of the Managing Director. Kendall Emerson, M.D., New York City.

Award of the Trudeau Medal. Charles J. Hatfield, M.D., Philadelphia, Pennsylvania.

Report of the Committee on Nominations. W. Atmar Smith, M.D., Charleston, South Carolina.

#### JOINT MEDICAL SESSION

#### PATHOLOGICAL AND CLINICAL SECTIONS

Tuesday, June 27, 9:30 a. m.

Symposium. Genito-urinary tuberculosis.

Pathological Aspects of Genito-Urinary Tuberculosis. Oscar Auerbach, M.D., Sea View Hospital, New York City.

Modern Concepts of Urogenital Tuberculosis. Gilbert J. Thomas, M.D., University of Minnesota Medical School, Minneapolis, Minnesota.

Symposium. Spinal tuberculosis.

Pathological Aspects of Spinal Tuberculosis. T. A. Willis, M.D., Cleveland, Ohio.

Early Recognition and Treatment of Tuberculous Involvements of Vertebral Bodies. Mather Cleveland, M.D., New York City.

incidence of serious hypoglycemia is very low. Single injections are virtually unknown to cause death except in the presence of complications. He next related the history of a sixteen-year-old girl with chronic hypoglycemia whose chief complaint was a tendency to drowsiness and unconsciousness in the early forenoon. In 1933-1934 she was studied at the Massachusetts General Hospital, and an exploratory laparotomy for adenoma of the pancreas was performed. No tumor was found, and a biopsy showed normal tissue. The patient was well until 1938 when the attacks recurred. After an unusual attack in school, she was admitted to the Boston City Hospital where further studies were carried out. She was referred to the Deaconess Hospital where a fasting blood sugar value of 27 mg per 100 cc. was obtained. An increase in the 3 a m meal prevented the early morning attacks. Two sugar tolerance curves significantly demonstrated definitely low blood sugar values in the fourth to the sixth hour. A tumor was considered most likely and with the realization that along present lines the patient would lead a nervous hampered life, operation was advised and performed. After three hours of careful exploration of the pancreas, a 1-cm. tumor nodule was found in the head of the pancreas. Its position was such that surgical removal was very difficult, but this was accomplished. The patient has had an uneventful postoperative course, and her fasting blood sugar level is now normal. The pathological report stated that the tumor was a benign adenoma of the islets of Langerhans. The tumor was a dull red, encapsulated mass. In cases of chronic hypoglycemia one must consider liver, thyroid, and pituitary disease in the differential diagnosis.

The next paper was presented by Dr. Howard Root, "Diabetic Coma." He said that diabetic coma cannot be entirely eliminated because there are too many variable factors concerned, such as the diet, the insulin and the course of the disease itself. It is primarily due to a disturbance in carbohydrate metabolism, and insulin is a specific in treatment which has no substitute. The onset is always gradual, taking hours or even days, with increasing weakness, a clouding of the mentality and glycosuria. In a later stage the pulse and respiratory rates go up, and there are polyuria and ketonuria. Progressing still farther, respiration becomes feeble and shallow and ketone bodies disappear from the urine, due to failing kidney function. The terminal stage is one of anuria and requires extremely rigorous treatment with a constant intravenous drip of saline. Meager doses of insulin are practically useless, insulin must be given generously.

Death from diabetic coma can be prevented by early diagnosis. In one series of cases 20 per cent of the patients were in coma when first diagnosed. General care following recovery is as important an element of treatment as the emergency measures. Following an attack, resistance to infection is markedly reduced, and 16 per cent of such patients acquire pulmonary tuberculosis within three to five years.

Dr. Richard Wagner spoke on "Peculiarities of Therapy of Diabetic Children on Two Continents." Dr. Wagner had been in charge of a special diabetic clinic for children in Vienna before coming to Boston to work on the same problem. He stated that in Vienna he found that diabetic children were very liable to pyorrhea and periodontal disease, which was often severe enough to cause the loss of all their teeth. This he finds to be a rarity in Boston. Assuming the disease process and the insulin to be the same, he believes that there might be a hereditary predisposition for both diseases. In addition, fruit and foods rich in vitamin C are economically difficult to procure and their ingestion has not become a habit in Vienna, as it has in Boston.

Pulmonary tuberculosis occurring in diabetic children is usually fatal. Whereas in Vienna, Dr. Wagner had found an incidence of 9 cases of the adult form of tuberculosis in 192 diabetic children, in Boston the incidence is 1 in 400. In Vienna, 30 per cent of children between the ages of seven and eight years had positive tuberculin tests, and 50 to 60 per cent of those fourteen years old. In Boston, 3 per cent of fourteen-year-old children are tuberculin positive.

Dr. Howard F. Root read a paper on "A Resurvey of Dr. Harvey Cushing's Patients with Acromegaly and Young's Experimental Pituitary Diabetes." The theory that a pathologic process in the pituitary gland is responsible for diabetes has often been refuted because no lesions could be demonstrated. However, it is well known that a clinical syndrome may exist without demonstrable pathologic changes in an organ. Even in diabetes itself only 70 to 75 per cent of the cases show changes in the pancreas and liver. Houssay has demonstrated that hypophysectomy of a dog whose pancreas had been previously removed caused the induced diabetes to become milder. Young, of London, injected anterior pituitary extract into a normal dog and found that he could thus produce diabetes more like the real disease than that produced by pancreatectomy, and that it varied from the mildest to the most severe degree of diabetes. Best, of Toronto, removed the pancreas in such a dog and found that the diabetes became no worse. Pathologically, the islets of Langerhans showed an even degeneration.

In a review of 153 cases of acromegaly at the Peter Bent Brigham Hospital it was found that 17 per cent of the patients had diabetes and in all of these the diabetes was secondary by one to twenty-two years. Radiation of the pituitary or its surgical removal produced no change in the diabetes. The degree of severity of the disease and its response to insulin varied in no great manner from the usual non-acromegalic type. Acromegaly is rare in diabetic patients, 5 cases in 15,000 being reported in one series. Dwarfism occurs in 5 per cent of the progeny, and other glandular dyscrasias are also common. There is splanchnomegaly in acromegalics with or without diabetes, there is no splanchnomegaly in patients with uncomplicated diabetes.

Dr. Priscilla White discussed "Thirty-Three Pregnancies in Diabetic Patients in 1938 and Studies Thereon." In the pre-insulin era only every other pregnancy terminated successfully. Diabetes does not affect maternal mortality so much as it causes miscarriages, stillbirths and neonatal deaths. Severe diabetic coma or severe hypoglycemia is not compatible with the birth of a living child, of course, but even the most carefully regulated diabetic gravida often fails to give birth to a live infant.

In an effort to determine the cause of these stillbirths, studies on hormones have been carried out. In 1930, Murphy reported an excess of prolan excretion in diabetics. Smith and Smith studied hormone-excretion values in patients with pre-eclampsia and with diabetes, having found that 30 per cent of the former have diabetes. Dr. White presented the hypothesis that stillbirths are not primarily due to the diabetes but to the associated toxemia, as evidenced by edema, rise in blood pressure and albuminuria, the onset of which is now predictable two to six weeks in advance by the rise in serum prolan. Thirty-three diabetic patients had weekly prolan values determined. They can be divided into three groups. The first group of 13 cases showed normal prolan values and had perfectly uneventful clinical courses. In the second group of 12 cases the prolan excretion was elevated, but no special treatment was given, 9 developed pre-eclampsia

## MEDICAL CLINICS\*

## JOINT SESSION OF PATHOLOGICAL AND CLINICAL SECTIONS

Wednesday, June 28

## MEDICAL CLINIC NO 1, BOSTON CITY HOSPITAL, 2 00-4 00 P M

Acute and Chronic Mediastinitis Chester S Keefer, M.D., associate professor of medicine, Harvard Medical School, associate physician, Thorndike Memorial Laboratory, Boston City Hospital

Pulmonary Aspects of Cardiovascular Disease Soma Weiss, M.D., associate professor of medicine Harvard Medical School, associate physician, Thorndike Memorial Laboratory, Boston City Hospital, director, Second and Fourth Medical Services Boston City Hospital

X Ray and Clinical Manifestations of Boeck's Sarcoid Theodore L. Badger, M.D. assistant in medicine Harvard Medical School, chief of Thoracic Clinic, Boston City Hospital

Parenchymal Lesions of the Lung in Lymphoma Henry Jackson, Jr., M.D., assistant professor of medicine, Harvard Medical School, associate physician, Thorndike Memorial Laboratory, Boston City Hospital

Pulmonary Disorders in Diseases of the Blood. George R. Minot, M.D., professor of medicine, Harvard Medical School, director, Thorndike Memorial Laboratory, Boston City Hospital

## MEDICAL CLINIC NO 2, BOSTON CITY HOSPITAL, SANATORIUM DIVISION, 2 00-4 00 P M

The Result of Pneumothorax at the Boston Sanatorium. John A. Foley, M.D., clinical professor of medicine, Boston University, chief of staff, Boston City Hospital, Sanatorium Division

Results of Surgical Treatment of Tuberculosis at the Boston Sanatorium. Horace Binney, M.D. visiting surgeon, Boston City Hospital, Sanatorium Division.

Tuberculous Tracheo-Bronchitis Samuel Cline, M.D. laryngologist, Boston City Hospital, Sanatorium Division.

## MEDICAL CLINIC NO 3, MASSACHUSETTS GENERAL HOSPITAL, 2 00-4 00 P M

Bronchiectasis and Lung Abscess, Tumors of the Lung and Bronchi Edward D Churchill, M.D., John Homans Professor of Surgery, Harvard Medical School, chief of West Surgical Service, Massachusetts General Hospital, Donald S King, M.D., associate in medicine, Harvard Medical School, associate physician, Massachusetts General Hospital, and associates.

## MEDICAL CLINIC NO 4, MIDDLESEX COUNTY SANATORIUM 2 30-4 30 P M

Treatment of Spontaneous Pneumothorax. Frank P Dawson, M.D., assistant physician, Middlesex County Sanatorium

Bronchial Complications in Pulmonary Tuberculosis. Lowrey F Davenport, M.D., instructor in medicine, Harvard Medical School, internist, Middlesex County Sanatorium, assistant in medicine, Massachusetts General Hospital, and Reuben Schulz, M.D., instructor, Department of Pathology, Harvard Medical School, instructor, Department of Hygiene, School of Public Health, Harvard Medical School, pathologist, Middlesex County Sanatorium.

Management of Internal Pneumolysis Patients. Harlan F Newton, M.D., associate in surgery, Harvard Medical School, chief surgeon, Middlesex County Sanatorium.

Treatment of Pulmonary Tuberculosis in the Adolescent. Henry D Chadwick, M.D., lecturer, School of Public Health, Harvard Medical School, medical director, Middlesex County Sanatorium, and Helen W. Evans, M.D., resident physician, Middlesex County Sanatorium

## MEDICAL CLINIC NO 5, NEW ENGLAND DEACONESS HOSPITAL, 2 00-4 00 P M

Some Experiences in the Study of 350 Patients Suffering from Diabetes and Tuberculosis. Howard F Root, M.D., instructor in medicine, Harvard Medical School, physician, New England Deaconess Hospital

Combined Intrapleural and Extrapleural Pneumothorax Julius G Kelley, M.D., superintendent, Barnstable County Sanatorium

Extrapleural Pneumothorax. Richard H. Overholt, M.D., New England Deaconess Hospital

Extrapleural Oleothorax. N R Pillsbury, M.D., superintendent, Norfolk County Hospital.

Lobectomy and Pneumonectomy in Tuberculous Subjects. Garnet P Smith, M.D., superintendent, Bristol County Hospital.

Carcinoma of the Lung Olin S Pettingill, M.D., superintendent, Essex County Sanatorium.

Do Results Justify Bilateral Thoracoplasty? E. K Jenkins, M.D., Norfolk County Hospital.

Thoracoplasty without Deformity W R. Rumel, M.D., New England Deaconess Hospital.

## MEDICAL CLINIC NO 6, PETER BENT BRIGHAM HOSPITAL 2 00-4 00 P M

Actinomycosis of the Lung and Pleura. Elliott C Cutler, M.D., Moseley Professor of Surgery, Harvard Medical School, surgeon-in-chief, Peter Bent Brigham Hospital, and Robert E. Gross, M.D., instructor in surgery, Harvard Medical School, resident surgeon, Peter Bent Brigham Hospital.

Tuberculosis in a Children's Hospital A fifteen-year survey. Clement A Smith M.D., instructor in pediatrics, Harvard Medical School, associate physician, Children's Hospital

Cardiac Pseudo-Tuberculosis Merrill C Sosman, M.D., assistant professor of roentgenology, Harvard Medical School, roentgenologist, Peter Bent Brigham Hospital

Tuberculosis in the Students of the Harvard Medical School Roy M. Seideman, M.D., Commonwealth Fund, Tuberculosis Division, Massachusetts State Department of Health

In connection with Clinics No 2 and No 4 special bus transportation will be provided at a nominal cost. The clinics are open to all physicians attending the meeting. Admission however will be by ticket only. Please write for reservations to Dr. Frederick T. Lord 305 Beacon Street Boston, indicating which clinic you wish to attend and giving your preference for other clinics in case you cannot be admitted to your first choice. Clinics may be designated by number or by the hospital at which they are to be held. Early application for tickets is suggested especially since the seating capacity of all the amphitheatres is limited.

## Symposium Atelectasis

Pathological Aspects of Atelectasis Max Pinner, M.D.,  
Montefiore Hospital, New York City  
Clinical Aspects of Atelectasis Edward N Packard,  
M.D., Saranac Lake, New York.

## PATHOLOGICAL SECTION

Tuesday, June 27, 2 00 p m

Charles H Boissevain, M.D., Colorado Springs, Colorado,  
*Chairman*

Arthur J Vorwald, M.D., Saranac Lake, New York,  
*Vice Chairman*

Correlation of X Ray Findings and the Pathology of the  
Cavity Walls Arthur J Vorwald, M.D., Saranac  
Laboratory, Saranac Lake, New York.

Phases of Intoxication in Tuberculosis H J Corper, M.D.,  
and Maurice L. Cohn, Ph.D., National Jewish Hos-  
pital, Denver, Colorado

Study of Localization and Type of Tuberculous Lesions  
in Cattle. E M Medlar, M.D., Metropolitan Life  
Insurance Company Sanatorium, Mount McGregor,  
New York.

The Growth of Tubercle Bacilli in the Tissues of Normal  
and of Allergic Guinea Pigs C E Woodruff, M.D.,  
and Ruby G Kelly, William H Maybury Sanatorium,  
Northville, Michigan

## CLINICAL SECTION

Wednesday, June 28, 9 30 a m

D O N Lindberg, M.D., Decatur, Illinois, *Chairman*  
John Alexander, M.D., Ann Arbor, Michigan,  
*Vice Chairman*

The Clinical Evaluation of Respiratory Function Walter  
K Whitehead, M.D., and A T Miller, Jr, M.D.,  
Detroit, Michigan

Pulmonary Function in Pulmonary Tuberculosis Under  
Various Forms of Collapse Therapy Andre Cour-  
nand, M.D., Bellevue Hospital, and Dickinson W  
Richards, Jr, M.D., associate professor of medicine,  
Columbia University College of Physicians and Sur-  
geons, New York City

Critical Survey of Extrapleural Pneumothorax Therapy  
Frank S Dolley, M.D., consulting specialist, Olive  
View Sanatorium, Los Angeles, California.

Boeck's Sarcoid and Systemic Sarcoidosis David Reisner,  
M.D., visiting physician, Sea View Hospital, New York  
City

Clinical Studies of Asbestosis Moses J Stone, M.D., as-  
sistant professor of medicine, Boston University School  
of Medicine, Boston.

## JOINT LAY SESSIONS

## SOCIAL WORK AND ADMINISTRATIVE SECTIONS

Tuesday, June 27, 9 30 a. m

Interpreting Modern Methods of Tuberculosis Control to  
the Public

From the official point of view Henry F Vaughan,  
Dr P H., commissioner of health, Detroit, Michi-  
gan.

From the non-official point of view Mrs. Katherine  
Z W Whipple, secretary, Health Education Ser-  
vice, New York Tuberculosis and Health Associa-  
tion, New York City

Statutory Limitations on State and Federal Rehabilitation  
Service. John A Kratz, M.D., chief, Vocational Re-  
habilitation Service, Office of Education, Washington,  
District of Columbia.

Wednesday, June 28, 2 00 p m.

How Tuberculosis Associations May Use the Tuberculosis  
Specialist to Interest the General Practitioner in Tuber-  
culosis J Emerson Dailey, M.D., Houston, Texas.

The Training of Health Educators C E. Turner, Dr P.H.,  
professor of biology and public health, Massachusetts  
Institute of Technology, Cambridge, Massachusetts.

Regional Differences in Sanatorium Facilities from the  
Standpoints of Accommodations, Sources of Financial  
Support and Operating Costs. Joseph W Mount, M.D.,  
senior surgeon, United States Public Health  
Service, Washington, District of Columbia.

## SOCIAL WORK SECTION

Wednesday, June 28, 9 30 a. m.

Harold G Trimble, M.D., Oakland, California, *Chairman*  
Mrs D McL McDonald, Columbia, South Carolina,  
*Vice Chairman*

How Many Tuberculosis Patients Survive? H E. Hilleboe,  
M.D., director, Division of Tuberculosis, State Board  
of Control, St. Paul, Minnesota.

The Nurse as a Teacher of Tuberculosis to the Family  
C Mayhew Derryberry, senior public health status-  
tician, United States Public Health Service, Washington,  
District of Columbia.

Tuberculosis Among Nurses A study of ten years' experi-  
ence. Everett K. Geer, M.D., medical director, Tuber-  
culosis Pavilions, Ancker Hospital, St. Paul, Minne-  
sota.

The Story of the Treatment of Tuberculosis at Rutland  
State Sanatorium. Ernest B Emerson, M.D., superin-  
tendent, Rutland State Sanatorium, Rutland, Massa-  
chusetts

## JOINT SYMPOSIUM

## PATHOLOGICAL, CLINICAL, SOCIAL WORK, AND ADMINISTRATIVE SECTIONS

Thursday, June 29, 9 30 a. m

Subject Mass Tuberculin Testing and X Raying A review  
of present status

Tuberculin. Esmond R. Long, M.D., director, Henry  
Phipps Institute, Philadelphia, Pennsylvania

X Ray Findings in Negative and Positive Reactors.  
Bruce H. Douglas, M.D., tuberculosis controller,  
Detroit Department of Health, Detroit, Michigan.

Epidemiological Considerations. James A Doull, M.D.,  
professor of hygiene and public health, School of  
Medicine, Western Reserve University, Cleveland,  
Ohio

Discussion.

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## AUGUSTIN BELLOSTE AND THE TREATMENT FOR AVULSION OF THE SCALP

### The Odd History of an Operation in Head Surgery

LUTHER M. STRAYER, M.D.

STRATFORD, CONNECTICUT

THE perforation of the outer table of the skull in cases of avulsion of the scalp, in which periosteum is removed from the calvarium, is a procedure advised in textbooks of surgery of today, such as Homans<sup>1</sup> and Christopher.<sup>2</sup> In tracing the recorded references to the operation from these textbooks, James Robertson, through his son Dr. Felix Robertson,<sup>3</sup> who wrote in the *Philadelphia Medical and Physical Journal* in 1806, has been credited with originating the idea. And originator he was, so far as concerns all periodical literature since 1850, including the reports by all modern surgeons who have used the procedure and recorded their experiences with it.

A book entitled *Remarkable Cases in Surgery* by Paul Eve,<sup>4</sup> and appearing in 1857, however, contains another account of the operation. It is here reprinted in full.

Dr. Felix Robertson, the President of the Trustees of the Medical Department of the University of Nashville, was born in 1781, and was the first male child born in Nashville. In retiring from the presidency of the Tennessee Medical Society, April, 1855, he delivered an address of which the following is an extract, taken from the *Nashville Journal of Medicine and Surgery*, vol. viii, 1855:

On the 11th of January 1781 he who now addresses you was born, and David Hood, in passing from the lower to the upper fort was fired on by Indians in ambush at the Sulphur Spring, in the northern part of the city. He was pierced by three balls, and fell on his back apparently dead. The Indians rushed on him and killed him, and stamped him on the back of the neck to dislocate it, and left him, believing he was dead. He lay perfectly still for a long time as it seemed to him, and, when he believed they had gone, he cautiously peeped about and could not see them. He then got up, and slowly wended his way toward the upper fort, a most pitiful looking object, as you may imagine but what must have been his horror when, getting near the top of the bank, he saw the whole company on the hill but a few steps from him. He

said he saw their white teeth as they laughed outright at his strange figure. He turned and tottled back as fast as his little strength enabled him, some four or five firing at him as he turned back, two balls wounding him slightly. They did not attempt to pursue him, and after passing down the ravine a little way his strength entirely failed him, he crept into the brushwood, and lay there until men went out from the forts, and found him, and conveyed him in. My father reached home late that night from a trip to Kentucky, and early next morning went in to see Hood expecting to find him, if not dead, a very forlorn case. On inquiring of David how he was, he replied 'Not dead yet, and I believe I would get well if I had half a chance.' My father told him he should have a whole chance and David did get well, and lived to a good old age. My father had seen many persons who were scalped in East Tennessee, and had there learned from a traveling French surgeon how to treat them. This was to perforate the outer table of the skull with a shoemaker's awl over the whole naked surface, making the perforations very close together. Through these perforations, granulations sprang up and gradually spreading, finally all united and formed a covering to the denuded skull, before it should die and exfoliate, and thus expose the brain. I am sorry that I can not recollect the name of the French surgeon who introduced the practice, for he deserves to have his name immortalized for the great boon he bestowed on the frontier settlers of that day. This operation became, in time, so common that there were persons in every fort who performed it.

While reading this amazing story of frontier hardihood, the phrase "traveling French surgeon" stimulated the present author to search further in the older medical literature, with fascinating results.

Sneve<sup>5</sup> in 1888 noted the above method as described in Eve's *Surgical Cases*, and used it successfully in a case of a burned scalp. In concluding his report he remarks:

To an unknown French surgeon, therefore, belongs the credit of having conceived this most unique procedure. It would be interesting to know whether science or accident were responsible for the conception. A knowledge of the anatomy of the parts and

Experience with Extrapleural Pneumothorax. Harlan F. Newton, M.D., associate in surgery, Harvard Medical School, senior associate in surgery, Peter Bent Brigham Hospital, and John E. Dunphy, M.D., Arthur Tracy Cabot Fellow, Harvard Medical School, junior associate in surgery, Peter Bent Brigham Hospital.

Thirty-Three Years Experience with the Treatment of Pulmonary Tuberculosis by the Group System in an Outdoor Department of a General Hospital. Nathaniel K. Wood, associate in medicine, Peter Bent Brigham Hospital

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, MAY 29

WEDNESDAY MAY 31

\*12 m Clinico-pathological conference. Children's Hospital amphitheater

FRIDAY JUNE 2

\*10 a m 12 30 p m Tumor clinic. Boston Dispensary

SATURDAY JUNE 3

\*10 a. m 12 m. Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr. Henry A. Christian

\*Open to the medical profession

MAY 26—Massachusetts Psychiatric Society Page 817 issue of May 11

MAY 26—Massachusetts Italian Medical Society Page 768 issue of May 4

JUNE 1 and 2—Fourth Annual Convention of the National Gastroenterological Association Page 857 issue of May 18

JUNE 5 6 7 and 8—American Association of Industrial Physicians and Surgeons Page 581 issue of March 30

JUNE 6—Harvard Medical Alumni Association Page 851 issue of May 18

JUNE 6—Tufts College Medical School Alumni Page 851 issue of May 18

JUNE 6—Boston University School of Medicine Alumni Association Page 851 issue of May 18

JUNE 6 7 and 8—Massachusetts Medical Society Worcester

JUNE 7—Massachusetts Medico-Legal Society Page 851 issue of May 18

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases Page 815 issue of May 11

JUNE 26-29—National Tuberculosis Association Page 897

JUNE 29—Pentucket Association of Physicians 8 30 p m Hotel Whittrier 5 Washington Street, Haverhill

AUGUST 30 SEPTEMBER 2—Seminar in Physical Therapy Page 857 issue of May 18

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 5 8—American Congress of Physical Therapy Page 857 issue of May 18

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 15-28—Pan Pacific Surgical Association. Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3—New York Academy of Medicine. Page 581 issue of May 18

FALL 1939—Temperature Symposium Page 218 issue of February 2

MAY 14 1940—Pharmacopoeial Convention. Page 894

## DISTRICT MEDICAL SOCIETY

NORFOLK SOUTH

JUNE 14—Page 897

## BOOKS RECEIVED FOR REVIEW

*Syphilis and Its Accomplices in Mischief Society the state and the physician* George M. Katsanos. 676 pp Athens, Greece Privately printed, 1939 \$5 00

*Getting Ready to Be a Father* Hazel Corbin. 48 pp New York The Macmillan Co., 1939 \$1 25

*Love and Marriage* Havelock Ellis, c New York Liveright Publishing Corp., 193

*Physiology of the Uterus With clinical* Samuel R. M. Reynolds 447 pp New Y don Paul B Hoeber, Inc., 1939 \$7 50

*Personal and Community Health* C. E. edition. 652 pp St. Louis C V Mosby Co

*The Synovial Membrane and the Synovia special reference to arthritis and injuries* David H. Kling 299 pp Los Angeles M 1938 \$5 00

*Food and Health An introduction to th nutrition* A. Barbara Callow Second edit New York Oxford University Press, 1938

*Self-Help Coöperatives in Los Angeles* Panunzio, Wade Church, and Louis Wasserm Berkeley University of California Press, 1939

*State Aid to Local Government in California* W Crouch 421 pp Berkeley University o Press, 1939 \$2 00

*The Initiative and the Referendum in Califo* Key, Jr., and Winston W Crouch 598 pp University of California Press, 1939 \$1 75

*The Diplomatic Recognition of the Border S* II Estonia. Malbone W Graham. 398 pp University of California Press, 1939 \$1 50

*Handbook of the Vaccine Treatment of Chrmatic Diseases* Oxford Medical Publications. F Crowe. Third edition. 95 pp New York Ox versity Press, 1939 \$1 25

*The Genuine Works of Hippocrates* Transla the Greek by Francis Adams 384 pp Baltum liams & Wilkins Co., 1939 \$3 00

*Clinical Studies in Psychopathology A contri the aetiology of neurotic illness* Henry V Du pp Baltimore William Wood & Co., 1939 \$4

*Fever and Psychoses A study of the literaturerent opinion on the effects of fever on certain p and epilepsy* Gladys C. Terry 167 pp New Y London Paul B Hoeber, Inc., 1939 \$3 00

*Sex and Internal Secretions A survey of re search* Edited by Edgar Allen. 1346 pp Bal Williams & Wilkins Co., 1939 \$12 00

*Science in Progress* Edited by George A. Baitse pp New Haven Yale University Press, 1939 \$4

## BOOK REVIEW

*Cancer Its diagnosis and treatment* Max Cutle Franz Buschke. Assisted by Simeon T Cantril. pp Philadelphia and London W B Saunders: 1938 \$10 00

This is unquestionably the best book on cancer v has appeared in the last ten years. Since the last ed of Ewing's *Neoplastic Diseases*, there has been a definite need for a text prepared by someone thorou familiar with the field of cancer and capable of presen in straightforward fashion the diagnosis and therape problems

There is adequate discussion of the principles of ra tion therapy, together with some of the hazards invol therein, a very fair appraisal of methods of biopsy, a adequate consideration of the spread of cancer, follow by a series of more or less detailed considerations of various clinical types of the disease. The illustrations : abundant, well selected and clear. The recent literatu is adequately considered, and representative groups of st tistics are given for the various clinical types of tumors



myelitis or early complete "agglutination" Their one case report is that of a boy who was treated by Desault by immediate replacement of the scalp. The patient recovered with but slight suppuration at the edges of the replaced scalp. The success of this case influenced their discussion of the subject, and although they discuss the opinions of La Motte, Fr Martel, Felix Wurtz and Cesar Megatus and mention Augustin Belloste as one

his life was recorded in 1778 by Eloy.<sup>9</sup> A translation from the French follows

Belloste, Augustin, was a great surgeon of Paris where he was born in 1654. He served with distinction in the armies and hospitals of the Most Christian King of France, but the Duke Victor Armande de Savoy, King of Sardinia, removed him to his kingdom in 1697 and placed him at the service of the Queen, his mother, in the rank of first surgeon. In 1695 he first published a book entitled *Surgeon of the Hospital, and a Method to Heal Wounds Promptly*, of which there are many different editions. We note those of Paris in 1696 [Fig 1], 1698, 1705 and 1715, in octavo, of Amsterdam in 1707, in octavo, of Dresden in 1703, 1710 and 1724, in octavo, translated into German by Martin Shurig. In 1725 Belloste published *Sequel to the Surgeon of the Hospital*, which appeared the same year in Paris, and again in 1728 in duodecimo editions. In this he combined his important observations on the effects of mercury and the use of this mineral with purgatives. His treatise on mercury was reprinted in 1738 in duodecimo. Denis Saneassani put the whole work into Italian under the title of *The Surgeon in the Field* (Venice 1729), two volumes, in octavo, one may say that it has been translated into almost all the languages of Europe. So many editions and versions amply prove the high estimation in which this book was held. Belloste took from the ancient methods which had been neglected and thereby made a name for himself which is still upheld. It is following Celsus that he advises piercing the carious bone with the point of a trephin to accelerate exfoliation, and from Cesar Magatus that he demonstrated the danger of tampons and frequent dressings in the healing of wounds.

There are some letters of this surgeon in the works of Saneassani, who speaks of him with great respect. He was also respected by the public for his success in the practice of his art, and he still enjoyed a brilliant reputation when he died at Turin on July 15, 1730.

Belloste<sup>10</sup> in 1696 wrote as follows

If the bone is uncovered for a considerable extent, with loss of substance, the wound cannot heal for a long time because of its size, and one is not able to prevent the bone from becoming altered and carious, by whatever precautions that might be taken. Now in order to avoid this accident it is necessary at the first dressing, or as soon as possible, to pierce the bone in several places with the pyramid or perforator of the trephin, in this manner one gives passage to a marrow juice which, oozing out, covers the bone in a short time without loss of the least part of its substance.

To be a surgeon, one should know that whenever the bone is uncovered for a considerable area, it is impossible for the soft parts to regenerate without recourse to the Art [of surgery], because the surface is very smooth and polished. It is this fact which obliged most of the ancients to apply the rasp to make it rough and at the same time to open the orifices of the small vessels, of which the internal substance is filled, in order to furnish the blood which is necessary to produce new flesh which heals it.

But the operation which I have done on several occasions and which I propose here seems to me more prompt, sure and useful than the rasp, which while passing several times over the surface of the uncovered

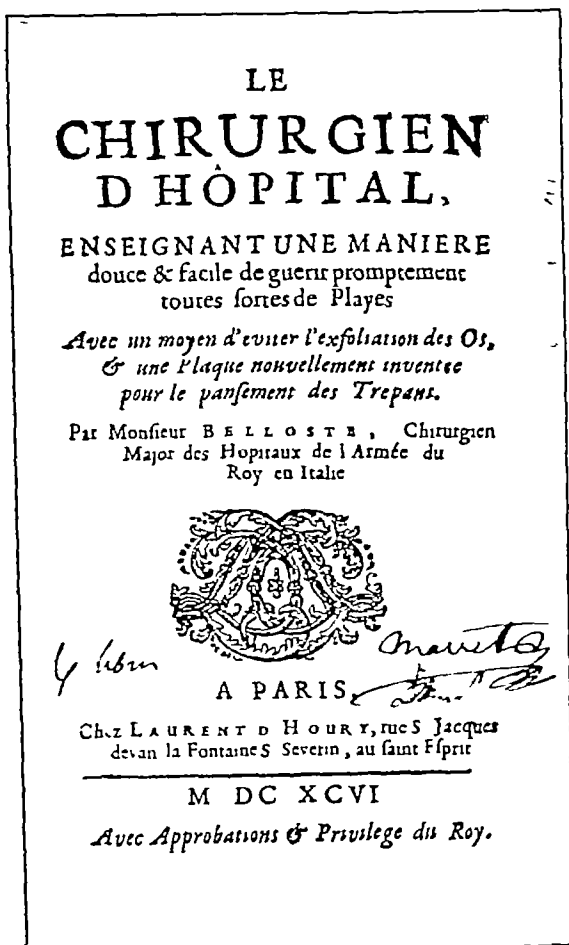


FIGURE 1

Title page of Belloste's book, 1696 containing his account of an operation for avulsion of the scalp. Author's copy.

who practiced multiple perforations, they minimize the deep concern of the older writers over the exfoliation of the denuded cranium and Belloste's method of avoiding it. This attitude was apparently that of most surgeons.

Biographically, Belloste has enjoyed the favor of the more delightful and obscure medical historians. None of the major historical writers have mentioned him in the role of contributor to medical progress. An almost contemporary account of

the physiologic laws governing the reproduction of tissues could have suggested to him the operation, and on the other hand clinical observations of granulations springing from an exposed diploë might have done so. The knowledge of this procedure seems to have been lost after a time, as there are no records that I can find of its having been resorted to on the frontier during the last 40–50 years, though numerous instances have occurred of individuals who have been thus mutilated by the Indians and recovered with bare crania.

Curiously enough, Dr Sneve's article is the only one referring to Eve's book and the report as given in the *Nashville Journal of Medicine and Surgery* which I encountered in going through the literature. This present communication is largely an answer to all his speculations concerning the "unknown French surgeon" and his knowledge.

A search of all the literature under the subject of avulsion of the scalp, wounds of the scalp or scalping, as found in the Surgeon General's Library, the *Index Medicus* and *Quarterly Cumulative Index*, led me no nearer to the truth. Invariably the references to the origin of the procedure—and it is very pertinent to note that two German articles are included—lead to the article written by Dr Felix Robertson<sup>3</sup> and published by the *Philadelphia Medical and Physical Journal* in 1806, when he was twenty-five years of age.

III Remarks on the Management of the Scalped Head. By Mr James Robertson of Nashville, in the State of Tennessee. Communicated to the Editor by Felix Robertson, M.D., of the same place.

In the year 1777, there was a Doctor Vance about the Long Islands of Holsten [located in the Tennessee River] who was there attending on the various garrisons, which were embodied on the then frontiers of Holsten, to guard the inhabitants against the depredations of the Cheerake Indians. This Doctor Vance came from Augusta County in Virginia. In March of the same year, Frederick Calvit was badly wounded, and nearly the whole of his head skinned. Doctor Vance was sent for and staid several days with him. The skull bone was quite naked, and began to turn black in places, and, as Doctor Vance was about to leave Calvit, he directed me, as I was stationed in the same fort with him, to bore his skull as it got black, and he bored a few holes himself to show the manner of doing it. I have found, that a flat pointed straight awl is the best instrument to bore with, as the skull is thick and somewhat difficult to penetrate. When the awl is nearly through, the instrument should be borne more lightly upon. The time to quit boring is when a reddish fluid appears on the point of the awl. I bore at first, about one inch apart, and, as the flesh appears to rise in those holes, I bore a number more between the first. The flesh will rise considerably above the skull and sometimes raise a black scale from it, about the thickness of common writing paper. It is well to assist in getting off the scales of bone with the awl. These scales are often as large as a dollar and sometimes even twice as large.

It will take, at least two weeks from the time of boring for it to scale. When the scale is taken off at a proper time, all beneath it will appear flesh like what

we call proud flesh, and as if there was no bone under it.

The awl may, at this time, and indeed for a considerable length of time, be forced thru the flesh to the bone without the patients feeling it, but after any part has united to that portion of the scalp, which has remaining original skin, it becomes immediately sensible to the touch.

The scalped head cures very slowly, and if this kind of flesh rise, in places, higher than common, touch it with blue stone water, dress it once or twice a day, putting a coat of lint over it every time you dress it, with a narrow plaster of ointment.

It skins remarkably slow, generally taking two years to cure up.

In the year 1781 David Hood was shot, at this place, with several balls, and two scalps were taken off his head, and these took off nearly all the skin which had hair on it. I attended him bored his skull and removed from almost the whole of his head, such black scales as I have described above. It was nearly three or four years before his head skinned over entirely, but he is now living and well.

In 1789, Richard Lancaster and Joel Staines were both wounded, scalped, and left for dead. These persons were under my directions, and their heads were bored as above described. They both got well in the course of 2 years.

M Baldwin, and some others, were scalped either in the year 1790, or 1791. Their skulls I also bored or directed it to be done. They all recovered.

I never knew one that was scalped and bored as above described that did not perfectly recover. There is always part of the scalped head over which but little or no hair afterwards grows.

In 1769 I saw a young man in South Carolina, who had been scalped eight years before that time and about twice the size of a dollar of the bone of his head was then perfectly bare, dry and black. I am persuaded that had this skull even then been bored he might have recovered of the wound which put an end to his life about a year after I saw him, the naked portion of bone having rotted or mortified, and exposed the substance of his brain, a very considerable quantity of which issued out at the opening, at his death. Nashville, — April 10th, 1806.

Patrick Vance, although mentioned in this article, seems not to be remembered by modern writers. There is another record<sup>4</sup> of the procedure which I obtained through a descendant of Vance's.<sup>7</sup> From this document we learn that Patrick Vance was appointed third surgeon with the pay of assistant at Camp Lady Ambler on October 20, 1776, in the Christian campaign, which was commanded by Colonel William Christian, who was ordered to Long Island (of Holsten, Tennessee) with a force of men and reinforced by detachments under Colonels William and Love and Major Winston of North Carolina.

In Bérard and Denonvilliers's textbook of surgical technic,<sup>8</sup> published in 1851, there is a section on the treatment of wounds of the scalp with denudation of the cranial bone. As a first principle these writers state that if the scalp is recovered, replacement may be followed by osteo-

for those who wished to take a medical degree half a century earlier. The number of graduates is not however an indication of the number of students, for, while many men who studied medicine at Edinburgh took the qualification of the College of Surgeons, right up to the passing of the Medical Act in 1858, a large number of students were content to learn their profession as apprentices to some practitioner and to take a few classes at some medical school such as Edinburgh without proceeding to qualification.

In Boerhaave's *Aphorisms*<sup>18</sup> we find

249 If the Pericranium, or Hair Scalp be so much wounded that it discovers the Bone for a long while or that it putrefy, the Bone is deprived of the Vessels of the Periosteum and consequently of its own, the Liquor is then stagnate, and, being putrefied, separateth a Scale, after which, the Bone, grown yellow, dusky and black, doth deposit a Leaf. 252 The Cure is effected 1 By piercing the Bone as deep as its Middle with a little Trepan, applied to several but near adjoining Places, whereby Exfoliation is prevented and the Periosteum is made to grow again. 253 By which Method there ariseth out of all these Perforations and from all Sides in a small Time, as it were, a new fleshy Substance and afterwards the Rest heals.

Van Swieten<sup>12</sup> in his commentaries on the aphorisms of Boerhaave gives Bellosté full recognition for stating the above, especially does he emphasize that it is a primary and not a secondary procedure. He also records Bellosté's two case reports.

Bellosté's significant contribution was to state that small perforations of the outer table should be made at the primary dressing of the wound, thus entirely avoiding exfoliation or sequestration. The method has been used by modern authors

Here, then, is the story of a definite surgical procedure which, so far as can be found, originated with one man, Augustin Bellosté, in 1696, passed from Boerhaave to Patrick Vance, and carried into modern literature through the medium of two Americans—Felix and James Robertson. No other authors have ever claimed to have thought of the method independently. This is a very peculiar sequence of events, which has combined to preserve for us one small bit of surgical lore. Others even more valuable must have been lost. Such are the vagaries of history.

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bone, heats and alters it much more than the perforator which touches but lightly, at slight intervals from each other, and which penetrates far enough to reach the diploë from which one draws the help we need. Moreover, the rasp diminishes the thickness of the bone, and subjects the patient to pain, which one avoids by this operation.

The bone of the cranium takes its nourishment from three separate sources, according to the opinion of several authorities. Firstly, from its under surface or internal portion, which is next the brain, through the vessels of the dura mater. Secondly, from the central part which is between the tables, it is nourished by a marrow juice which, arising from the diploë, communicates to the two tables and furnishes them the necessary food. Thirdly, on its external aspect it is nourished and protected by the periosteum by which it is covered for its entire extent.

Thus when by some outside violence the bone is scalped of this, so that it remains uncovered, it is well assured that the air attaches itself to the external surface with its acid and nitrous points, which in a short time alter and decay it, it is necessary then that it exfoliate because it is deprived of nourishment and the air finds it without defense.

It is then necessary to find a means of repairing the loss to the bone and to find in the neighboring parts food which takes the place of that lost, and which at the same time in covering it shelters it from external injuries. Such cannot be found closer than in the diploë, but to have it, a passage must be made and open to it easy pathways to fulfill at the same time the intention of Nature and that of the surgeon. When the bone is opened as described above, the diploë pushes through these little passages the most subtle parts of its marrow juice, which, coagulating in the bone in three or four or five days, sometimes more or less, completely cover it.

One will have a little hesitation in using this technique if one realizes that it avoids about forty days before exfoliation and the time thereafter necessary to granulate and cicatrize the ulcer, all told taking the poor patient almost sixty days in place of twelve or fifteen at the most following this method.

Belloste then records the cases of two soldiers with moderate-sized wounds which required eighteen and seventeen days respectively for healing.

There are a number of interesting sidelights which turned up in the older literature. Jacobus Renatus Tenon,<sup>11</sup> for whom Tenon's capsule of the eye is named, took a very active interest in Belloste's idea, indeed so much so that he used a number of dogs as subjects of observation in controlled experiments. He denuded both sides of the skull and perforated the outer table on one side with a trephine about the size of a "12 sous piece." Various dressings then in vogue were applied to both sides, such as, water, wine, balsam of Peru, basilicum, *plâtre de masticque*, *l'eau mercuriale*, and in some animals the skull was exposed to the air. His final conclusion was that perforation did not aid healing of the wound enough to justify its use. However, the size of his opening, which caused excessive formation of granulation tissue,

was larger than either Vance or Belloste advised. Let us observe that the publication of these results was in the year 1806, the same as that in which Robertson's<sup>3</sup> account was published in Barton's journal.

The writers of the older books of surgery (Hippocrates,<sup>12</sup> Galen,<sup>12</sup> Celsus<sup>13</sup> and Fabrice d' Aquapendente<sup>14</sup>) knew that baring the calvarium of periosteum was a severe wound and that the outer table often became carious, finally either exfoliating or causing an osteomyelitis, sometimes fatal. Celsus advised the perforation of the dry, blackened sequestrum with an awl or terebra some time after the injury. Fabrice, following Galen's practice, recommended rasping the denuded cranium. All these writers deferred action until delineation between sequestrum and normal bone had occurred. One curious and questionable case, reported by de Marchettis,<sup>15</sup> and antedating Belloste, was that of a seven-year-old boy from the orphanage at Batavia who had his scalp torn off by a bear. Granulations arose from between the sutures and covered the head in fifteen days, and in three months the entire wound was healed and hairs were even growing in the scar.

The problem then resolved itself into the necessity of explaining why the only link between modern literature and the old textbooks should be through but one man, Patrick Vance. None of the nineteenth-century English or American texts on surgery contain any reference to the procedure. Perhaps the authors knew of it but regarded it as of no account.

From a descendant of Dr. Vance,<sup>7</sup> it was learned that his full given name was Kilpatrick. He was born in Scotland and claimed to be a graduate of the University of Edinburgh. It is not known when he came to this country. A letter<sup>16</sup> from the dean of the School of Medicine of the Royal Colleges, Edinburgh, who made inquiries in the Library of the College of Physicians there, states: "There is no evidence that he ever took the qualification here, and his name does not appear on the list of graduates in Edinburgh, Glasgow or Aberdeen." However, Comrie's *History of Scottish Medicine*<sup>17</sup> states that most of the men who founded the Royal College of Physicians and the Faculty of Medicine at Edinburgh were graduates of French universities or had studied under Boerhaave at Leyden, and that Boerhaave's books were used extensively as texts for the students at the time when Kilpatrick Vance was presumably studying there.

Comrie further states

During the latter half of the eighteenth century Edinburgh was the great medical resort of all Britons beyond the seas, much as Leyden had been the resource

stances with dispatch, clamors impatiently for an answer from the worker in biological sciences as to the value and significance of his compounds. Before the final answer as to the therapeutic efficacy of a chemical substance can be given, however, numerous questions have to be answered, and the answer to each requires repeated and tedious investigation. To ascertain the relative efficacy, toxicity and persistence of action under various routes of administration is merely a beginning. Long-continued experiments must follow the short ones. The biological characteristics of the compound should be ascertained in many species of animals and often in lower organisms. There follows a search to determine the physiological and pharmacological effect on various tissues, organs and systems. Eventually as many of these features as is feasible have to be investigated in normal man. Finally, it is necessary to study the effects and biological characteristics of the compound in different diseases. Because the experimental therapeutic approach in diseased persons is limited, it is also essential to study the effect of an agent in disease induced in animals. After encouraging preliminary investigations, a drug may fail to be useful simply because one of its many biological characteristics is not in accord with the therapeutic problems of the specific disease for which it was intended. A vasodilator substance, for example, may fail to be useful in a certain disease simply because it has to be given intravenously or because it has only a short persistence of action. Obviously, with all the investigative opportunities available, it is feasible to supply answers to all these questions for but a limited number of substances. Hence, whereas the chemist can prepare a substance rapidly, medicine must give the answer slowly. It is sometimes discouraging to find that long years of world-wide clinical application of a chemical substance are necessary before its serious untoward reactions are discovered. I refer to such examples as amidopyrine, causing agranulocytosis, cinchophen, producing acute yellow atrophy of the liver, codeine, responsible for drug addiction, arsphenamine causing blood dyscrasias, and phenobarbital (Luminal) or allyl-isopropyl-acetyl-carbamide (Sedormid), causing serious skin rashes.

If a chemical substance reveals a certain biological action which makes it a possible but not an ideal therapeutic agent, attempts are often made to alter the chemical structure with an expectation, rational from a biochemical viewpoint, of obtaining the desired action. Not infrequently, however, the answer supplied by the experimental and clinical studies is different from the theoretical expectation. Such experiences further

strengthen the need for prolonged investigation.

A few specific examples bearing on such recent activities in this field will make these points clearer. Let us consider, therefore, three groups of substances as illustrations: barbiturates, sympathomimetic drugs and the morphine group.

#### BARBITURATES

Thirty-five years ago Emil Fischer and von Mehring established the fact that while barbituric acid, a derivative of urea and malonic acid, is physiologically relatively inactive, the substance obtained by replacement of the two hydrogen atoms by ethyl radicals is a powerful hypnotic in animals and man (Fig 1). Since this discovery a

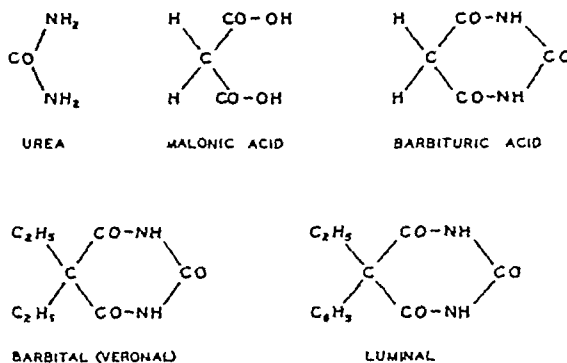


FIGURE 1 The Chemical Structures of Urea, Malonic Acid and Barbituric Acid Which Possess No Hypnotic Effect, and of Their Ethyl and Phenyl Derivatives, Veronal and Luminal

large number of other barbituric acid derivatives have been prepared by replacing one or both hydrogen atoms by alkyl, cyclic and other radicals. Partly through their beneficial effect in certain conditions and partly through the zeal of manufacturing houses, these substances have become widely used in different branches of medicine. The barbituric acid derivatives are certainly among the most widely used drugs today. Veronal, Luminal, Ipral, Amytal, Allonal, Dial, Pernocton, Somnifen, Nembutal and Evipal are but a few of the trade names of the more commonly used barbituric acid derivatives.

A number of significant facts have been brought to light as a result of these studies. It has been found that often the hypnotic value and the toxicity of members of the group have been increased by substitution of the two hydrogen atoms by longer and more complex alkyl or cyclic radicals. The anesthetic value was found to be relatively higher in the ethyl iso-butyl, the ethyl normal butyl, the ethyl-iso-amyl and the ethyl normal hexyl barbituric acids.<sup>1</sup> Investigation revealed also remarkable differences in the excretion of the

## CHEMICAL STRUCTURE BIOLOGICAL ACTION THERAPEUTIC EFFECT\*

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THE discussion of the inter-relation between chemical structure, biological action and therapeutic effect seems to be timely. Research activities in fundamental and applied sciences continue to increase. The question is being raised whether universities should take part in these varied activities or restrict their interests to the cultivation of selected disciplines. As a further complication, an increasing number of research institutes have been established in recent years by foundations and by industrial corporations. What is to be the future role of these institutions? Should the less well-equipped university departments, in order to avoid duplication, intentionally cultivate a more fundamental type of investigation and more general correlations? Should there be any sort of inter-relation between university departments and these research institutes? Should industrial research laboratories be used for the temporary training of a limited number of mature students in science, in the same manner as the clinic is used for medical students? Whatever the final answer, we must be cognizant of these changing activities, which are of potential significance.

The question has also been raised by those who are interested in these problems and who are trained primarily in chemistry, as to whether the biological sciences and clinical medicine, in particular, are not unduly lagging behind chemistry. One branch of the biological sciences, namely pharmacology, has been particularly criticized. The correct appraisal of this question is a primary concern of those associated with a medical school.

I shall confine this discussion to an analysis of one phase of this topic.

By citing a few selected examples, I propose to supply an explanation for the following conclusions: (1) Notwithstanding skepticism, important progress has been made in recent years in the field of knowledge which depends on the proper integration of chemistry, certain medical sciences and therapeutics. (2) While from a theoretical point of view there exists an ideal method of correlation of activities between these fields,

in practice important advances and discoveries often fail to follow such a set pattern. (3) As most human ailments cannot be reproduced in animals, and as disease often represents not only quantitative but also qualitative change in functions and structures, study of the action of chemical substances in human disease remains an essential discipline. If today this field is not cultivated in the right way, it does not mean that the subject cannot be made a branch of science. (4) There are good reasons why progress in the chemical aspects of the biological sciences, particularly pharmacology and therapeutics, will always lag, at least apparently, behind chemistry. (5) While this field of activity is cultivated by all branches of chemistry and medical sciences, proper emphasis on and better correlation of the subject in the future may lead to progress of both theoretical and practical significance. Let us now examine these points in greater detail.

The reason for the apparent lag of the chemical aspects of biology and medicine is clearer today than it was formerly. Organic chemistry and biochemistry are relatively young. Pharmacy and therapeutics, on the other hand, are considerably older. Many significant discoveries in therapeutics were made, on purely empirical basis, many years or even centuries ago. The use of opium for the relief of pain and diarrhea, of cinchona bark in malaria, of coca leaves for relief of fatigue, of cod-liver oil and certain fruits in nutritional deficiencies, of iron in anemia, of digitalis in heart failure and of ephedra twigs as a stimulant are examples of such early therapeutic discoveries.

With the development of organic chemistry, toward the end of the nineteenth century, there were those who expected that the application of this new field to medicine not only would at once open up new avenues in pharmacy but would rapidly lead to discoveries of new cures for disease. Some of the therapeutic discoveries and the rapid initial development of experimental pharmacology at the beginning of the present century seemed to confirm and enhance such an optimistic expectation. Certain results during the past two decades, on the other hand, have injected skepticism into the rapid triumph of organic chemistry in medicine.

The chemist, who continues to prepare sub-

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in an important way on therapeutic applications. Already Barger and Dale have noted differences in pressor effects of various members in the capacity of ergotoxin to inhibit the vasopressor effects and in causing relaxation of the isolated, non-pregnant uterus of the cat.

The sensitivity of biological responses to slight chemical changes is strikingly illustrated by the difference in the potency between levo- and dextro-epinephrine. Pressor responses to a given dose of l-epinephrine are much greater than those induced by the corresponding d-isomer. The duration of the response is more prolonged, on the other hand, in the case of the d-isomer. It may be pointed out here that the ratio of the muscular contracting power to the relaxing power of the d- and l-epinephrines is not definitely known, in spite of the fact that epinephrine has been investigated extensively. This illustrates the fact that certain pertinent and obtainable knowledge is still lacking, even in such an extensively studied and important substance.

Chen has pointed out that the phenolic groups in the epinephrine molecule are responsible for the intensity of action. With the entrance of a methyl group in the  $\alpha$  carbon atom, ephedrine appears to acquire increased duration of action. Chen found that the primary amines are more active than the corresponding methylated secondary or tertiary amines, especially with reference to pressor action (Chen, Wu and Henriksen<sup>3</sup>).

Figure 2 demonstrates the chemical structure of a few of the sympathomimetic substances. While all these compounds possess vasopressor effects, they differ in several important ways. Catechol, for example, in contrast to other sympathomimetic drugs, exerts a convulsant and cardiac depressor action (Tainter<sup>4</sup>). Epinephrine and nor-epinephrine differ mainly in that ergotoxin reverses the pressor response to epinephrine, but not that of nor-epinephrine. Nor-epinephrine has a greater intrinsic power of inducing contraction of certain smooth muscle cells than has epinephrine. Epinephrine, on the other hand, has a much greater intrinsic power of inducing relaxation. Nor-epinephrine is suspected by some (Greer, Pinkston, Baxter and Brannon<sup>5</sup>) to be one of the adrenergic mediators of sympathetic nerve impulses, corresponding to sympathin E of Cannon and Rosenbluth<sup>6</sup>.

The differences in effect of epinephrine and ephedrine consist mainly in the effectiveness of ephedrine after oral administration, in contrast to that of epinephrine. The vasopressor and cardiac stimulant effects of ephedrine are much less intense but more prolonged. Ephedrine is a less efficacious bronchorelaxant agent, but it possesses a

remarkable stimulating effect on certain brain centers, which makes its action, in contrast to that of epinephrine, quite specific in certain conditions associated with sleep or coma, including narcolepsy.

The two synthetic compounds of amphetamine (Benzedrine) and paredrinol (Veritol) possess interesting pharmacological and therapeutic qualities. In its structure and action amphetamine is closer to ephedrine, while paredrinol resembles epinephrine. Amphetamine exerts less vasopressor, cardiac and bronchial effect, but has a greater central effect than does ephedrine. It has a remarkable action in decreasing or abolishing the sensation of fatigue. Its central stimulating effect makes it particularly suitable in the treatment of narcolepsy and in certain types of paralysis agitans.

Paredrinol is a compound with mainly vascular effect and without significant central nervous action. In contrast to amphetamine it is ineffective in narcolepsy. In contrast to epinephrine, it produces prolonged vasoconstriction after oral administration. The vasoconstriction involves both the arterioles and venules, but arteriolar constriction is not out of proportion to the elevation of the blood pressure. Tissue ischemia, observed after epinephrine, does not occur as a rule after the administration of paredrinol. From both experimental and clinical considerations, paredrinol seems to be a suitable therapeutic agent, while epinephrine is not applicable in certain types of collapse and shock.

#### MORPHINE GROUP

Advances in knowledge in this group of alkaloids are also instructive in the light of what has been said in the introduction to this discussion. Morphine is one of the most useful drugs. In China the use of opium dates back as far as the recognition of cholera there. The stalk of the poppy plant is mentioned as an ingredient of an Egyptian prescription in the *Papyrus Ebers*. The juice of the poppy was certainly an effective remedy in the hands of physicians of ancient Greece. Pliny was probably the first to use the word "opium". During the centuries immediately following, some progress was made in the effective use of opium preparations. The first milestone in this field, however, came with the contributions of the young German pharmaceutical apprentice Sertürner, who in a series of reports published between 1805 and 1817 described the isolation and certain pharmacological characteristics of morphine. Thereafter, as a result of the development of organic chemistry, experimental pharmacology and clinical medicine, valuable information was acquired concerning the chemistry and the biological action of morphine and certain related compounds.

various derivatives. Thus from 60 to 90 per cent of diethylbarbituric acid (Veronal) is eliminated through the kidneys, while other barbiturates are almost completely destroyed within the body. Marked differences have also been found in the persistence of action of the various members. Barbitol (diethylbarbituric acid) and Luminal (phenobarbital) have a persistence of action of many hours' duration, while the effect of Evipal (cyclo-hexamyl-methyl-n-methyl barbituric acid) lasts but a few minutes after intravenous administration. In the latter substance we possess a hypnotic with a complex side radical. This side chain is instantly metabolized in the body, and thus a biologically active compound is changed into one which is inert. The time element of induction of sleep also varies considerably. The sleep induced by some barbiturates is preceded by excitement, while others do not produce this effect.

If we wish to use a sedative as a preventive of convulsions in epilepsy, we use a barbiturate with long persistence of action, such as phenobarbital, in small doses. If we wish to combat severe convulsions we use the same type of barbiturate in large amounts. If we wish to induce natural sleep we select members with shorter persistence of action, in order to avoid a hang-over the next day. Pentobarbital sodium (Nembutal) and iso-amyl-ethyl barbituric acid (Amytal) are such barbiturates. If prompt anesthesia and relaxation of the muscles are desired, as in the treatment of fractures or dislocations, we administer Evipal intravenously and obtain the desired result for but a few minutes.

Studies of the barbiturates, particularly during the last ten years, have enriched medicine by providing a group of useful drugs which are administered in the treatment of insomnia, poisoning from local anesthetics, epilepsy, pain in childbirth and eclampsia. These drugs are also useful for the better induction of general surgical anesthesia. Today we have also adequate knowledge of the danger involved when barbiturates are used in large amounts, or when they are administered to persons with an idiosyncrasy to certain members of the group. We know that certain barbiturates are responsible for skin diseases and blood dyscrasias. In case of barbiturate poisoning, effective antidotes have been found in drugs such as picrotoxin, ephedrine and strychnine. Thus after making due allowance for unsupported claims, the accomplishments make the investigations of the past more than justified.

#### SYMPATHOMIMETIC DRUGS

It is fitting to discuss here the sympathomimetic group of drugs, not only because of their wide-

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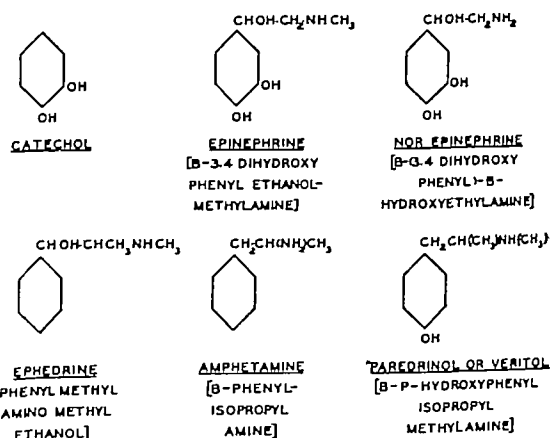


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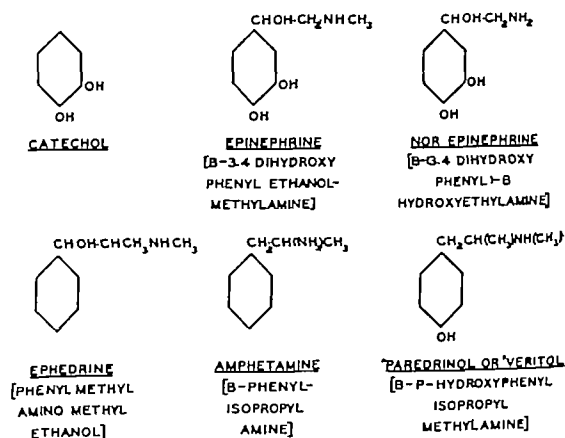


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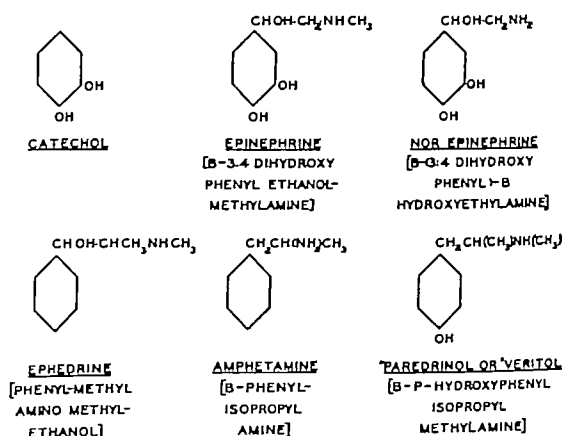


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treatment of abdominal distention) in patients with myasthenia gravis has yielded new insight into muscular physiology and pathology. Similarly, the empirical discovery of the therapeutic value of quinine in myotonia congenita has stimulated physiological studies on the striated muscles.<sup>9</sup> The casual clinical observation that a high-fat diet, devised for the treatment of epileptic children, has resulted in a rapid clearing up of co-existent pyelonephritis instigated a systematic investigation of the bactericidal effects of various organic acids. These studies in turn led to the important discovery of the value of mandelic acid in the treatment of certain types of pyelonephritis.

\* \* \*

Here, then, is a field of great significance for the future development of medicine. It should be cultivated in the future not less but more than in the past. If physicians are to maintain an interest not only in analytical but also in synthetic activities, they must foster more intensely this triple interest of correlations. Such increased knowledge

will give better insight into the secrets of life, and at the same time will assure better care of the sick. Therapeutic skill must depend not on an innate, intangible gift, but rather on a rational analysis and definition of the patient as a psychophysical unit, and on a knowledge of the possibilities as well as the limitations of those physical, chemical and abstract measures which improve or re-establish health.

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## THE TREATMENT OF TETANY WITH DIHYDROTACHYSTEROL (A T 10)\*

LEWIS M. HURXTHAL, M.D.,<sup>†</sup> BOSTON, AND  
T. STERLING CLAIBORNE, M.D.,<sup>‡</sup> ATLANTA, GEORGIA

IN 1936, when dihydrotachysterol first became available in this country, we were fortunate in obtaining a supply for trial in the treatment of parathyroid tetany.\* It at once became obvious that it caused an elevation of blood calcium toward normal and adequately controlled the symptoms of tetany. Being effective by oral administration, it promised to be the most convenient and effective method of controlling severe tetany. We immediately encountered two difficulties. In the first place, the cost of the material made its use undesirable by some patients with mild tetany which could easily be controlled by the oral administration of calcium lactate. Secondly, our doubts as to its value in all cases of severe tetany were raised by an apparent failure to elevate the blood calcium and control symptoms in a very severe case (Case 1), it was later learned that the apparent failure was due to lack of co-operation by the patient.

Dihydrotachysterol is known as A T 10 (antitetanic preparation Number 10), a derivative of

irradiated ergosterin, and is said not to be antirachitic. Introduced first by Holtz,<sup>1</sup> there have been numerous articles on its clinical use since then. Albright and others,<sup>2</sup> through their studies on its effect on calcium-phosphate metabolism, have concluded that A T 10 is the most efficacious therapeutic agent in the treatment of tetany. The reader is referred to their review of the literature for a fuller bibliography.

Vitamin D acts like A T 10 in facilitating calcium absorption from the intestinal tract, but its action is slower and there is less excretion of phosphorus in the urine. Both drugs raise the level of the blood calcium. Parathormone, while raising the blood calcium, is thought by Albright et al.<sup>3</sup> not to have any action on calcium absorption from the intestinal tract, although there is marked phosphorus secretion in the urine. This observation, in addition to the necessity of hypodermic injection, makes parathormone give way to the oral use of A T 10 in the treatment of tetany.

We have used A T 10 in 6 cases of postoperative tetany. All these patients had had tetany for two years or more, so that their status was

\*Furnished through the courtesy of the Department of Medical Research of the Winthrop Chemical Company Incorporated, New York City.

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In recent years, after a period of relative stagnation, interest in the field has been renewed. The new tools applied were those of synthetic organic chemistry. These recent efforts consist mainly in the preparation of new compounds through alteration of the morphine and codeine molecules, with the primary purpose of obtaining drugs with some of the therapeutic effects of morphine but without its undesirable effects (Fig 3).

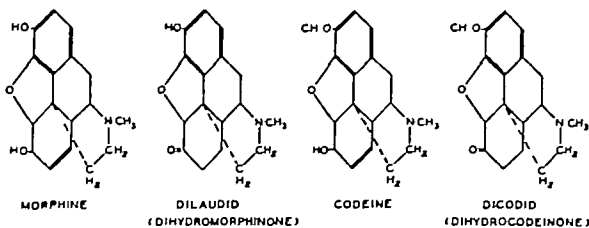


FIGURE 3 *The Chemical Structures of Morphine and of Related Compounds*

Codeine, which is chemically but a slightly altered morphine derivative, a methyl morphine, is about twenty times less toxic than morphine. It is only fairly effective as a therapeutic agent in the control of cough, and but slightly effective in the relief of pain. Up to the present codeine has not been regarded as a drug producing addiction. The story of its discovery as a drug of addiction is mentioned here to demonstrate how long a clinical fact may escape recognition. In 1927 the discovery was made in England that the importation of codeine had increased remarkably and that the drug had to some extent replaced morphine among addicts. In 1931, however, a group of experts appointed by the League of Nations expressed the opinion that codeine was harmless and did not produce addiction. Evidence that the drug was used extensively by addicts nevertheless continued to accumulate. Smuggling of the alkaloid into Canada had become disquieting, and illicit entry across the border into the United States had grown alarmingly. One of the experts mentioned reinvestigated the entire problem, and has called attention to the codeine danger.<sup>7</sup> He refers to experiments performed on animals with habit-forming drugs as more or less valueless. He also points out that there is little or no analogy between monkeys and human beings in their reactions to codeine, while in rabbits and other mammals the alkaloids of opium are apt to give rise to tetanic convulsions.

The biological properties, including the analgesic and respiratory action, of Dilaudid (dihydromorphinone hydrochloride) are quite similar to those of morphine, but Dilaudid is more than twice as toxic, as well as twice as effective. While tolerance to this drug develops less easily than does that to morphine, addiction has been reported

Dilaudid has a certain limited therapeutic use in preference to morphine.

The pharmacological and therapeutic properties of Dicodeid (dihydrocodeinone bitartrate) are closer to those of morphine than to those of codeine. Its respiratory-depressant and sedative effects are claimed to be more marked than those of morphine. Its narcotic and analgesic effects are less. Dicodeid, in contrast to morphine, does not cause constipation. The tendency to addiction after its prolonged use is less than after morphine.

Numerous additional efforts have been made in recent years to find useful therapeutic agents through changes in the morphine molecule. The practical applicability of the results of these studies cannot as yet be evaluated. In spite of the numerous new compounds which have been prepared and tested, it may be stated that so far no substance in this group with effective sedative or analgesic qualities is known which is not, at least to some degree, associated with a tendency to habit formation and to addiction.

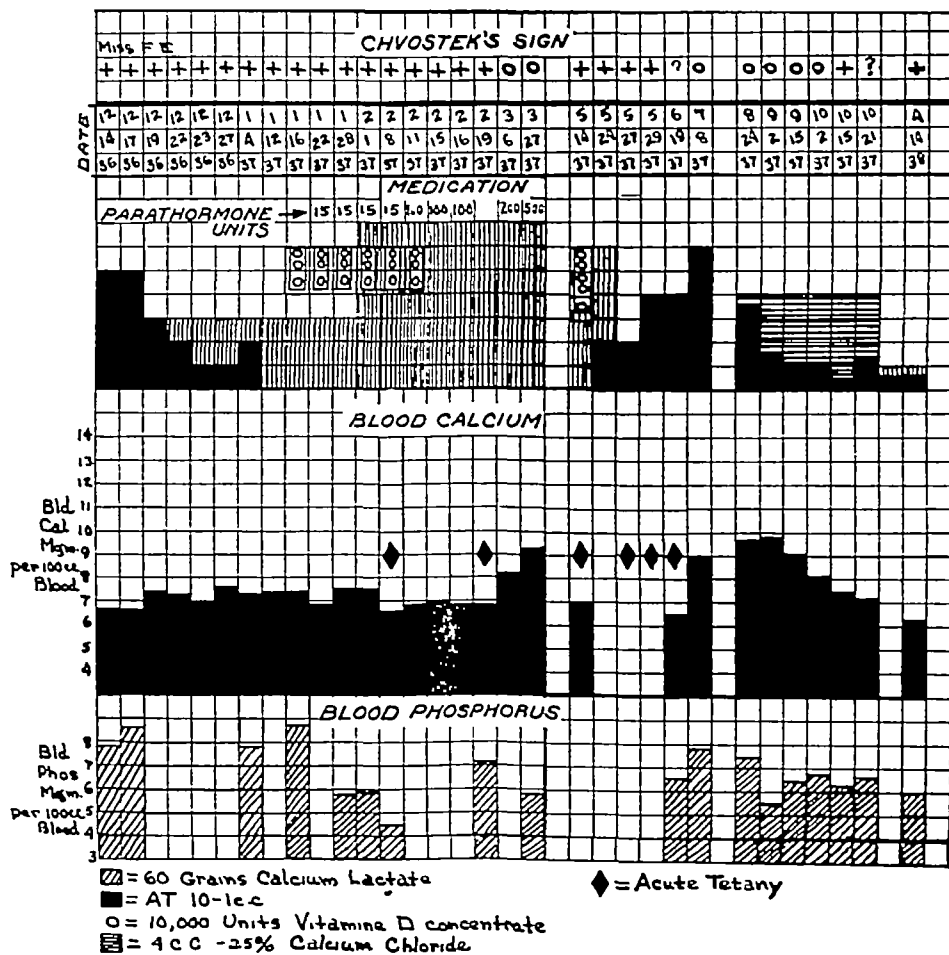
#### OTHER EXAMPLES

This discussion could be widened by presenting numerous additional examples of chemico-pharmacological correlations. The choline derivatives are of special interest today, as they play a fundamental role in physiology, pharmacology and therapeutics. Studies of the sulfanilamide group have resulted in therapeutic triumphs in certain infectious diseases. Systematic investigations of carbon tetrachloride, tetrachlorethylene and hexyl resorcinol groups have made possible more effective treatment of parasitic intestinal infestations. Finally, recent discoveries and correlations of the chemistry and biological action of substances related to phenanthren, cholesterol, vitamin D, estrogenic substances and the digitalis glucosides are opening up possibilities for a better understanding and the establishment of an inter-relation between the fundamental problems in the etiology of cancer, in the development of arteriosclerosis, in sex function and in myocardial failure. Perhaps with the development of this new knowledge the most instructive lessons can be drawn from the relation between molecular arrangement, function and cellular structure. This fascinating new chapter in medicine has been admirably summarized by Butenandt.<sup>8</sup>

In several important therapeutic advances the initial discovery and stimulus were provided by observations of the clinician at the bedside. The classic discovery of the efficacy of liver in pernicious anemia has stimulated important chemical investigations. The observation of the beneficial effect of Prostugmin (previously used only for the

The patient was not seen again for some months. When seen in April, 1938, she said she had not taken A.T. 10

*Case 2* The patient, a 28-year-old unmarried woman, was first operated on in the clinic in 1918 for exophthalmic goiter. In 1921 there was a recurrence of hyperthyroid symptoms. Lugol's solution was given but failed to control the symptoms, and in 1931 she was operated on be-



cause of recurrence of the hyperthyroidism. Following this a low metabolic rate developed, without much clinical evidence of myxedema. At the same time she had mild tetany. The blood calcium varied between 6 and 7 mg per 100 cc. This was easily controlled by administration of calcium and parathormone. In 1935 the patient had a transplant of parathyroid tissue culture (Fig 2), with no lasting benefit, although it seemed that for about two or three weeks she was able to get along without calcium.

well known, and with 2 exceptions were symptomatically controlled with calcium by mouth. Of this group, only 3 patients are still taking A T 10, the remainder having had to discontinue its use because of its high cost. It is hoped that this obstacle will soon be overcome so that it may be available to patients with average incomes.

In several of the milder cases, all calcium by mouth was stopped for from two to four weeks, A T 10 was then begun in doses ranging from 12 to 20 cc during the first four or five days, but thereafter reduced to 1 cc daily or 1 cc every other day. In severe cases calcium was stopped and A T 10 was begun immediately in larger doses, but shortly thereafter 1 to 3 cc daily was prescribed. Later, available calcium in the form of calcium lactate, chloride or gluconate was prescribed orally.

No toxic symptoms were observed except in those cases in which the blood calcium rose above normal. Two patients (Cases 2 and 3) had a hypercalcemia. One of these (Case 2) developed headache and the patient had an extreme aversion to taking the calcium, nausea was also present. The other patient (Case 3) complained of loss of appetite, nausea, headache and lassitude. Both patients soon lost their symptoms when A T 10 was discontinued, one (Case 3) even went through pregnancy without additional medication. Following delivery the dose was increased, during which time hypercalcemia developed.

The daily requirement of A T 10 apparently depends on the extent of the deficiency. Doses of 2 to 5 cc weekly are sufficient to control the milder moderate cases, while severe cases may require larger doses. Large doses are taken during the first week of treatment, the level of blood calcium is determined at least weekly thereafter. When the blood calcium has reached a normal level, an arbitrary dose of 0.5 to 2.0 cc is prescribed until the daily or weekly requirement is worked out. It is advisable to give calcium by mouth whenever it can be tolerated, as it reduces the amount of A T 10 required and in turn provides soluble calcium. In spite of arguments in favor of other calcium preparations, calcium lactate in our experience has been the best-tolerated form. Blood phosphorus levels have varied. In some cases, particularly when hypercalcemia was present, there was a marked drop, then the blood phosphorus rose again and the calcium dropped. In general, the average blood phosphorus level was lower after treatment. In one patient (Case 4), in whom severe hypertension developed, there was a gradual rise in the phosphorus level although the use of A T 10 was intermittent. In this case its employment in this manner required

less calcium, and there were longer periods of freedom from tetany.

#### CASE REPORTS

*Case 1.* A 20-year-old woman entered the clinic December 1, 1936, complaining of 'spells' which had occurred during the previous 10 months after subtotal thyroidectomy had been performed at another institution. These spells were typical of severe tetany and often ended in unconsciousness.

Examination showed that the patient was well developed and nourished. Marked exophthalmos was present, the pulse was 100 and no thyroid remnants could be palpated. The blood pressure was 140/80. The heart and lungs were normal. Chvostek's and Trousseau's signs were easily elicited. The patient entered the hospital 2 days later, at which time the level of the blood calcium was 67 mg per 100 cc, and that of the phosphorus 7.9 mg, two days later the value for calcium was 67 mg, and for phosphorus, 8.6 mg. The patient was given calcium lactate with some improvement and was then started on A T 10 (Fig. 1) but this was discontinued because she said it caused diarrhea. Some months later the patient revealed that she had been taking a large dose of mineral oil which had been secretly given her at the hospital, and which undoubtedly accounted for the looseness of the bowels.

The patient was then given large doses of calcium and vitamin D concentrate. The blood calcium reading in January, 1937, was 81 mg per 100 cc, and that of phosphorus 7.1 mg. Doses of parathormone were gradually increased, and she returned to the clinic with acute tetanic seizures, quickly relieved by intravenous injections of a 10 per cent solution of calcium gluconate. During this time she was given a diet low in milk, meat and eggs, without appreciable effect. In March she was taking 500 units of parathormone a day and said she took from ½ to 1 lb. of calcium lactate daily. The value for the blood calcium at this time was 81 mg per 100 cc, and she was getting along fairly well. On March 29 the blood calcium reading was 9.3 mg per 100 cc, and that of the phosphorus 5.9 mg. The patient continued on this regime, and in May entered the clinic with another attack of acute tetany. She had had several of these attacks while in neighboring cities. At this time she was taking 50,000 units of vitamin D, 300 to 400 units of parathormone and 10 teaspoonfuls of calcium lactate in powder form and ten 10-gr tablets of calcium lactate daily. Calcium chloride was again advised, but she could not tolerate it. From May 27 to July 1 the tetany was never adequately controlled and she had frequent attacks. All during this time Trousseau's and Chvostek's signs were positive. A T 10 in larger doses was begun, in addition to parathormone and large quantities of calcium. A blank space has been left in the chart for an interval during which the amounts of parathormone and calcium that were ingested are unknown, on one occasion during this period she was ordered to take 20 to 30 cc. of A T 10 daily for a few days. On July 14 the blood calcium was 8.9 mg and the phosphorus 7.1 mg per 100 cc, and Chvostek's sign was positive. On July 23 she was advised to take 15 cc. of A T 10 daily. On August 4 the level of the blood calcium was 9.9 mg and that of the phosphorus 4.1 mg per 100 cc, Chvostek's sign was negative and she was feeling well, being free from tetany. She was advised to reduce the dose to 7 cc. a day, the case was followed until September, the dose being cut down gradually to 4 cc. and 1 teaspoonful of calcium chloride four to six times a day. The value

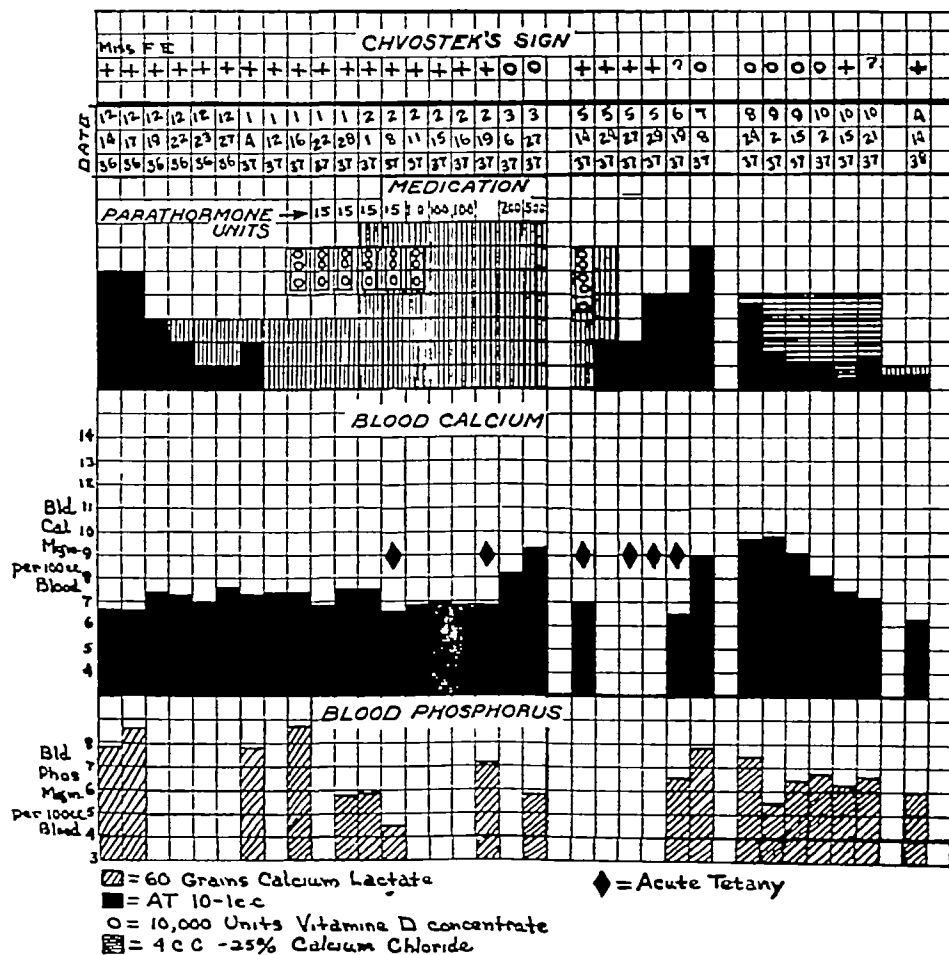


for the blood calcium remained normal, Chvostek's sign was negative, and dosage was further reduced to 1 cc. and then to 0.5 cc. daily. The blood calcium gradually fell to approximately 7 mg per 100 cc., and the patient was advised to increase the dose to 1 cc. daily for an indefinite period.

The patient was not seen again for some months. When seen in April, 1938, she said she had not taken A T 10

normal, and following this she obeyed instructions explicitly. She has also assured us that she took the prescribed quantities of calcium and parathormone.

**Case 2** The patient, a 28-year-old unmarried woman, was first operated on in the clinic in 1918 for exophthalmic goiter. In 1921 there was a recurrence of hyperthyroid symptoms. Lugol's solution was given but failed to control the symptoms, and in 1931 she was operated on be-

FIGURE 1 *Case 1*

*Control of severe tetany with AT 10* The dosage from December 14 1936 to March 27, 1937 is the amount ordered but as mentioned in the text the amount taken is uncertain. The period from March 27 1937 to May 14 1937, is omitted because of the uncertainty of dosage the patient being away at this time. Larger doses of AT 10 than those given subsequently were ordered during this period. The blood calcium August 24 1937 was normal while the patient was daily taking 3.5 cc of AT 10. Note the gradual fall of blood calcium as the dose of AT 10 was diminished. The latter figures are probably reliable.

or calcium regularly, the blood calcium had dropped to a little more than 6 mg per 100 cc., Chvostek's sign was positive and there were minor tetanic symptoms.

*Comment* Although this patient refused to co-operate, it is to be noted that the value of her blood calcium was normal for the first time and remained normal on a daily dose of about 15 cc. of A.T. 10. Although we cannot prove it, the patient assures us that she actually did take the required dosage at the time her blood calcium was

cause of recurrence of the hyperthyroidism. Following this a low metabolic rate developed, without much clinical evidence of myxedema. At the same time she had mild tetany. The blood calcium varied between 6 and 7 mg per 100 cc. This was easily controlled by administration of calcium and parathormone. In 1935 the patient had a transplant of parathyroid tissue culture (Fig 2), with no lasting benefit, although it seemed that for about two or three weeks she was able to get along without calcium

and with no symptoms of tetany. Since that time the patient has controlled her tetany easily with calcium lactate, taking about 5 teaspoonfuls daily. At other times she was given 40 drops of viosterol without much apparent help. The value for the blood calcium ranged from 8 to 9 mg per 100 cc. In 1936, A.T. 10 was started and the calcium was discontinued. The blood calcium rose to slightly over 10 mg per 100 cc. Treatment was continued intermittently until April 8, 1937. At this time she was taking about 120 gr of calcium lactate by mouth

over 4 mg A.T. 10 was discontinued, and the patient's blood calcium returned to a normal level in about one week. Her symptoms disappeared. Since that time the patient has been taking 0.5 cc. three times weekly with 60 to 120 gr of calcium lactate daily.

*Comment.* This patient seemed to get along satisfactorily without any unusual rise in blood calcium on 0.5 cc. of A.T. 10 daily. She was advised to return more frequently for a check up examination and for determination of blood calcium but neglected to do so, and without

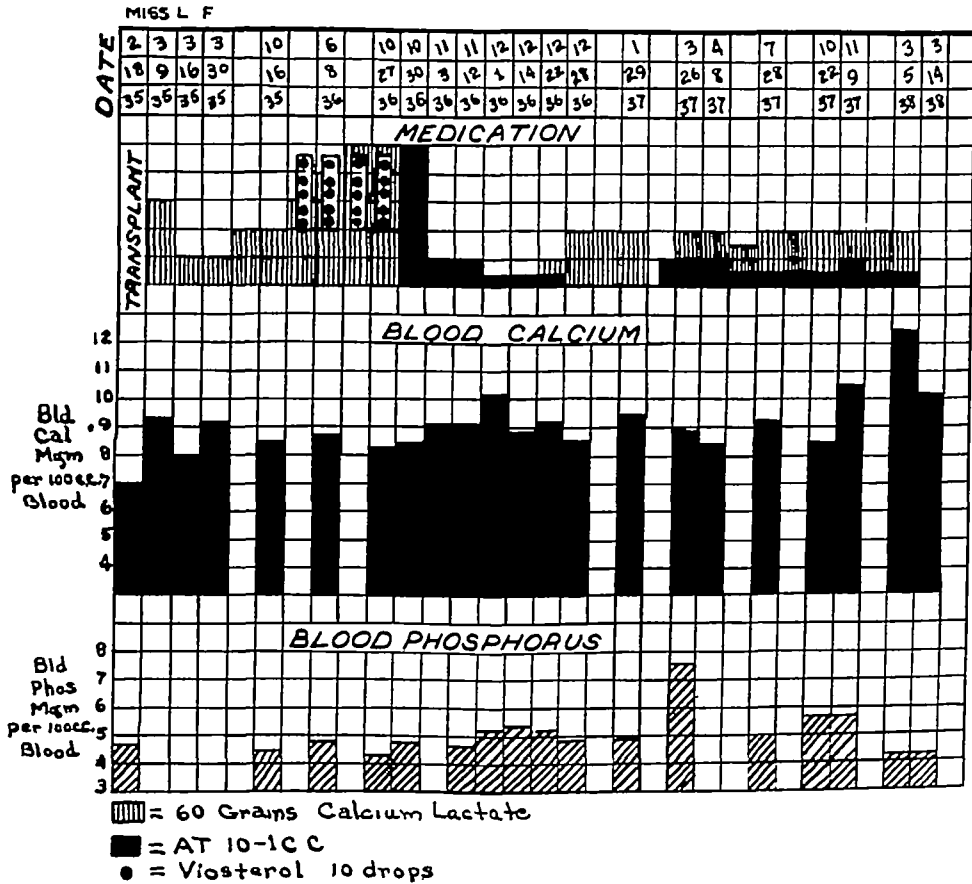


FIGURE 2 Case 2

*Control of mild tetany with AT 10 and development of hypercalcemia.* The value for the blood calcium on February 18, 1935 was 7 mg per 100 cc after the patient had been ordered not to take calcium for some time preceding a transplant of parathyroid tissue culture. On October 30, 1936 AT 10 was begun and calcium by mouth was omitted. The level of the blood calcium finally rose to 10 the highest it had ever been. From November 9 1937, to March 5, 1938, the patient took approximately the same amount of calcium daily, with 0.5 cc of AT 10. On March 5 1938 symptoms associated with hypercalcemia were present

and 0.5 cc. of A.T. 10 daily. This kept her free from symptoms although the level of blood calcium averaged between 8.5 and 9 mg per 100 cc. For a short while in November the patient took 1 cc. of A.T. 10 a day and then reduced the dose again to 0.5 cc. daily. She continued this until March 6, 1938, before coming in for a check up examination. At this time she reported because she felt ill. She had nausea and vomiting, loss of appetite, headaches, pain in the eyes and stated that she never wanted to see calcium again as long as she lived. The blood calcium at this time showed definite hypercalcemia, the level being 12.4 mg per 100 cc., the blood phosphorus was slightly

increasing the dose, hypercalcemia resulted. This illustrates the necessity for frequent determinations of blood calcium. This patient could easily get along without A.T. 10, since the tetany could be controlled with calcium lactate, but she preferred to take it, stating that she has fewer ups and downs when so doing.

*Case 3.* This 26-year-old woman entered the clinic in February, 1935. She had had a subtotal thyroidectomy elsewhere in July, 1928, following which she immediately showed evidence of parathyroid tetany which was partially relieved by giving calcium and thyroid extract.

Since then she had complained of stiffness in her fingers. Six months following operation the patient had a convulsion during which she became unconscious for about fifteen minutes. From that time until her admission to the clinic she had had four such attacks. At the onset of these attacks the patient cried out, fell and often injured herself. The last attack occurred one week before her admission.

The patient came to us mainly to find out if it were safe for her to be married because the grandmother of her fiance had had similar seizures.

was again given and also A.T. 10 in a dose of approximately 3 cc. a week. Pregnancy progressed without complications, but on this dose, without taking calcium, the level of blood calcium fell from 9.1 to 7.8 mg. per 100 cc. She was then given more calcium, and the dose of A.T. 10 was increased to 1 cc. a day for a month before delivery. She had no further trouble and gave birth to a normal, healthy child. The patient was given calcium gluconate intravenously just before delivery and the doses of calcium and A.T. 10 were increased for a few days after delivery,

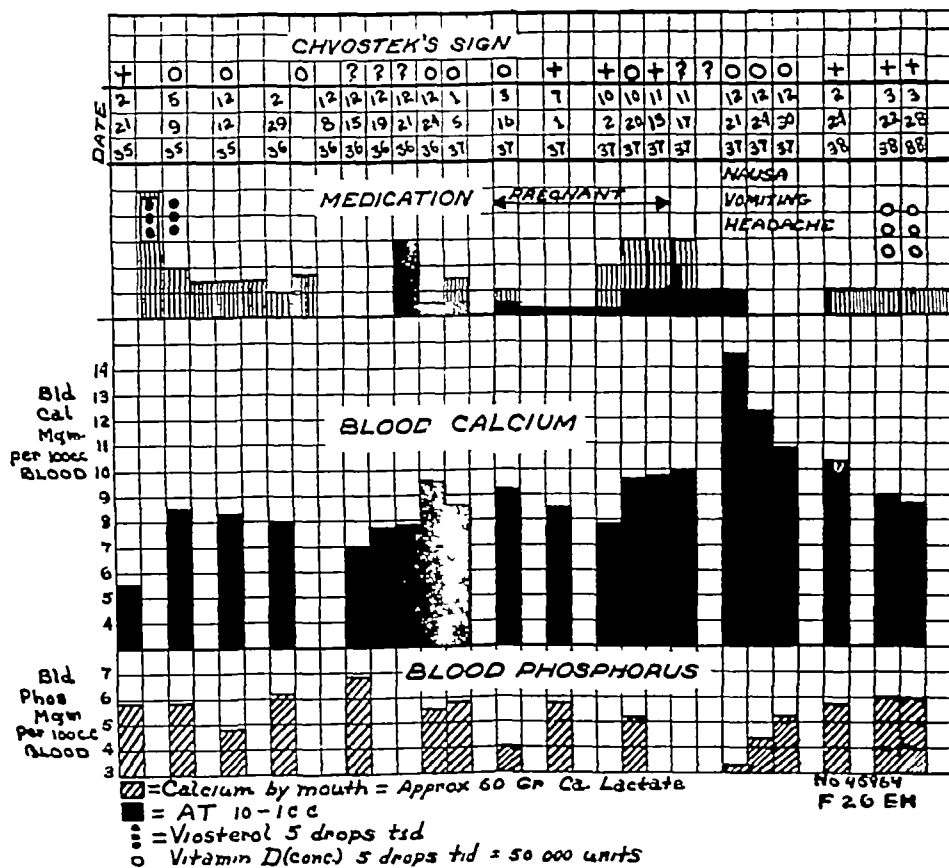


FIGURE 3 Case 3

Course during pregnancy of a patient with tetany, taking AT 10, subsequently hypercalcemia developed. The blood calcium determinations and dosage of AT 10 are shown in solid blocks. Note the level of the blood calcium on December 24, 1936 after AT 10 was begun, also the gradual drop of blood calcium during pregnancy with 0.5 cc of AT 10 daily. Note also the high level of blood calcium which developed one month after delivery while the patient took 1 cc daily with no calcium by mouth. Of interest is the low value for the blood phosphorus at this time.

The level of blood calcium was found to be 5.7 mg per 100 cc, and that of the blood phosphorus 5.8 mg (Fig 3). She was given viosterol and calcium lactate, this therapy raised the level of the blood calcium and her symptoms were immediately controlled. On December 8, 1936, all calcium was discontinued for a period of eleven days. The blood calcium averaged 7.5 mg per 100 cc, her fingers felt stiff, and her face tingled. AT 10 was then given, 3 cc. the first day and 0.5 cc. daily thereafter, with a rather prompt rise in the value for the blood calcium to over 9 mg per 100 cc. She discontinued AT 10 and resumed calcium until she became pregnant. Calcium

with the idea of preparing her for nursing her child. When she left the hospital the level of the blood calcium was 10 mg per 100 cc, and she was advised to continue with 1 cc. of AT 10 daily. She failed to come in for over a month at which time nausea, vomiting and headache developed. The blood calcium was found to be 14.3 mg per 100 cc. The blood phosphorus was very low, and as AT 10 was discontinued, the value for the blood calcium fell toward a normal level and the blood phosphorus returned to its previous level. Since that time the patient has been on calcium lactate by mouth and vitamin D concentrate, equal to 50,000 units of vitamin D daily. This

has kept her symptoms controlled, the blood calcium has varied between 8.5 and 9 mg per 100 cc. It would seem that during pregnancy, on a dose of approximately 3 cc. of A.T. 10 weekly, the blood calcium gradually fell.

**Case 4** This 42 year-old woman was operated on elsewhere in 1917 for exophthalmic goiter. She was first seen in the clinic in 1926 and said that she had had severe tetany ever since her operation. She had been treated with calcium and other preparations but had never been free from tetanic seizures. Merely rising suddenly from a chair would throw her into severe cramps. She suffered frequently from laryngeal spasm. From 1926 until 1936 she was treated in the clinic with calcium and, at times, parathormone. She had two transplants without permanent effect, one, a transplant of a parathyroid tumor from a patient with hyperparathyroidism, and the other, a transplant of a parathyroid tissue culture. For about a month after each operation her symptoms were ameliorated. She was started on A.T. 10 on November 20, 1937, 3 cc. was given daily for five days, and then 1 cc. daily thereafter. Calcium was discontinued. At the time A.T. 10 was started, the level of the blood calcium was 9.3 mg per 100 cc., and that of the blood phosphorus 8.3 mg. Only calcium lactate had been administered before this blood sample was taken. This, incidentally, was the highest value for blood calcium which had been recorded for some time. Before treatment was begun in the clinic her blood calcium had varied between 4.5 and 5.6 mg per 100 cc., and at the time of the tissue-culture transplant, when she was allowed to go without calcium, the blood calcium went down to 4.8 mg and the phosphorus to 6.3 mg. The patient continued with A.T. 10 until December 5, 1937. During that time she had taken no calcium by mouth and the blood calcium was reported to be 9.3 mg per 100 cc., and the blood phosphorus 8.3 mg.

The patient felt much better, and on December 19 she had had no spells whatsoever and was taking 1 cc. of A.T. 10 daily. The value for the blood calcium at this time was 9.5 mg per 100 cc. The dose was reduced to 0.5 cc. daily, which she continued to take until January 2, 1938, when the blood calcium was 8.6 mg, and the blood phosphorus 5.2 mg. She continued to have no further attacks and took no calcium. On January 25 the blood calcium reading was 7.7 mg, and the phosphorus 5.5 mg, and she was advised to take calcium lactate again, a heaping teaspoonful three times a day. In April, 1938, the blood calcium was 8.6 mg, and the phosphorus, 4.8 mg. She was taking 0.5 cc. of A.T. 10 every day and a level teaspoonful of calcium lactate three times a day. In June, 1938, the first seizure appeared. The blood calcium levels at this time were 8.5 mg and 6.8 mg on two separate occasions. From that date until December, 1938, she was not able to purchase A.T. 10, and the blood calcium gradually fell to 7.6 mg, with further seizures. Since then she has resumed A.T. 10 with complete relief and the blood calcium is maintained above 9 mg per 100 cc. Her blood pressure has gradually risen until, when last seen, it was 210/140, the blood nonprotein nitrogen was 24 mg per 100 cc., and the renal output 20 per cent of phenolsulfonphthalein in 30 minutes.

**Comment** A.T. 10 controlled the symptoms of this patient for the first time in 10 years without calcium, and its effect in this case has been most gratifying.

**Case 5** A 37-year-old woman was operated on in May, 1935, for recurrent hyperthyroidism. Mild parathyroid tetany developed on the day she left the hospital. She was given 60 gr of calcium lactate a day. The level of the blood calcium was 5.7 mg per 100 cc. Chvostek's sign was positive. Viosterol (15 drops a day) was administered. Later she said that she had received parathormone on several occasions. Her symptoms finally were fairly well controlled on 3 heaping teaspoonfuls of calcium lactate, three times a day, and 20 drops of viosterol. The value for the blood calcium was 7.5 mg per 100 cc., and that of the blood phosphorus 4 mg.

On December 15, 1936, the blood calcium was 7.1 mg and the phosphorus 3.8 mg. Calcium was discontinued and A.T. 10 started, 5 cc. the first day and 5 cc. the second day, then 3 cc. for several days and finally 1 cc. daily. She did not take calcium, and when seen two weeks later the blood calcium was 7.4 mg, and the phosphorus 4.8 mg, she felt improved.

In January, 1937, the calcium was 8.9 mg per 100 cc., she was taking 1 cc. of A.T. 10 daily. In June, 1938, the blood calcium was 8 mg, and the phosphorus 3.6 mg, she had been taking 1 cc. daily. The patient has also taken  $\frac{1}{2}$  gr of thyroid extract daily. She has never taken calcium since using A.T. 10 but has been advised to do so. We have been able to follow her through the courtesy and co-operation of Dr. Charles J. Ashwarton, of Providence, Rhode Island.

**Case 6** This 32 year-old woman was first seen in February, 1926. Operation was performed for exophthalmic goiter in July, 1926. Tetany after operation was controlled with calcium by mouth. The patient was seen October 14, 1936, at which time the value for the blood calcium was 9.3 mg per 100 cc., and that for the blood phosphorus 5.5 mg. She was ordered to take no calcium for 4 weeks, and had few symptoms during that time. Chvostek's sign was positive, the blood calcium was 8.8 mg, and the phosphorus 5.1 mg. She was given A.T. 10, 3 cc. a day for five days, at the end of which time the blood calcium was 9.3 mg, and the phosphorus 5.0 mg. The dose was reduced to 1 cc. daily for five days, when the blood calcium was 10.2 mg, and the phosphorus 4.8 mg. The dose was further reduced to 1 cc. three times a week. The blood calcium then was 9.2 mg, and the phosphorus 5.2 mg. Chvostek's sign was negative. She has been subsequently free from symptoms.

#### CONCLUSION

The use of A.T. 10 is an effective and convenient method of controlling severe tetany. While it is probably desirable to use it in all cases of tetany, milder cases can be controlled symptomatically with calcium lactate.

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## THE TREATMENT OF SEVERE CARBUNCLES BY X-RAY

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THE treatment of inflammatory lesions by x-ray is not of recent origin. Its use, however, in the treatment of carbuncles, either alone or as an adjuvant of surgery, has not been accepted so generally as would seem to be warranted.

Dunham<sup>1</sup> as early as 1916, reporting 67 cases of carbuncle treated by x-ray wrote, "Nothing in all roentgen therapy gives such positive and uniformly perfect results as the treatment of a carbuncle."

This optimism has been shared by roentgenologists these many years, although publication of detailed data on the subject has been infrequent. Coyle<sup>2</sup> in 1906 described 3 cases of carbuncle treated by x-ray. Dunham's cases appeared a decade later. Almost another decade passed before Hodges<sup>3, 4</sup> in 1924 and 1925 stimulated interest anew in the roentgen method of treating carbuncles. Light and Sosman<sup>5</sup> in 1930 analyzed 50 cases treated by x-ray, stating that the addition of the roentgen ray to the therapy of carbuncles gives promise of being perhaps the most valuable innovation of the past century.

Morton and Leddy<sup>6</sup> in the same year compared the results of early and late x-ray treatment of 26 cases, reporting analgesia, abortion and prompt improvement in those treated early. Similar results in 56 cases were observed by Firor<sup>7</sup> and by Whitmore<sup>8</sup> in 1935, the latter reporting 19 cases treated by x-ray, with a review of the literature.

King<sup>9</sup> in 1937 published the results of 33 cases of carbuncle treated by roentgen ray. The locations were as follows: 12 on neck, 8 on face, 4 on axilla, 5 on extremity and 4 on back. Of this series 3 cases were complete failures. Two of these were seen early, but in both the carbuncle was on the back of the neck and of the deep type in which the mass appeared to be fixed. Surgery had to be resorted to in each case. The third failure was in a case previously treated by incision, where evidently the infection had been carried down to the deeper structures by surgical procedure. Filtered radiation King found to be far superior.

Other articles, presenting for the most part generalizations, have appeared, but Light and Sosman's<sup>5</sup> comment on the meagerness of the English and American literature on the value of

x-ray therapy in the treatment of carbuncles still remains pertinent.

Sir James Paget<sup>10</sup> in his clinical lecture on the treatment of carbuncles indicated what is generally recognized today, that a carbuncle is often self-limited and may disappear regardless of the kind of treatment or with no treatment whatever. Incidentally he condemned the use of crucial incision and carrying it beyond the edges into healthy tissue because it did not prevent the carbuncle from spreading. Ordinary carbuncles on the lip and face, he declared, were no more fatal in those situations than in any other. He referred to what he called carbuncular inflammation of the lip or malignant pustule, which he recognized to be more serious than other types, but gave no adequate description of it. This condition probably represents carbuncle of the lip with cellulitis.

When carbuncle is self-limited, convalescence is brief and assured. This may well account for the reputed success of the variety of surgical and non-surgical methods of treatment described. Lest x-ray therapy be included in these "actively useless" measures, as characterized by Paget, carbuncle in the ambulant patient, a lesion that localizes quickly with little or no systemic reaction and no complicating disease, will not be discussed.

There is question here only of severe carbuncle, if you will, an inflammatory lesion that has spread to the subcutaneous tissue, causing a diffuse infection from which toxic absorption has occurred, presenting a fixed area of induration which later discharges on to the surface by a series of openings or massive slough. Each case presented was hospitalized, and had a systemic reaction characterized by fever and an extensive lesion, complicated in many cases by diabetes, and in some by cellulitis, meningitis or septicemia. Others had such accompanying and debilitating conditions as thyrotoxicosis, psychosis, varicose ulcer, compression fracture, subdural hematoma, mid-thigh amputation, carcinoma of the larynx and cardiac disease.

From 1924 to 1937, inclusive, 130 cases of severe carbuncle were treated in the wards of the Boston City Hospital by x-ray alone or in conjunction with surgery. Ninety-five patients were men and 35 women. One hundred and twenty-six patients were discharged well, 4 died, a mortality of 3 per cent.

The lesions were distributed as follows: pos-

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terior neck, 53, upper lip, 28, lower lip, 7, cheek, 16, chin, 6, back, 7, elsewhere, 13

From the viewpoint of radiation, these cases fall naturally into three groups. Group 1 comprises 60 patients who received roentgen therapy only with dry dressings and had an average hospital stay of eight and a half days. Group 2 represents 34 cases given x-ray therapy before surgery, the latter consisting of puncture, crucial incision or excision of slough, the average hospital stay was thirteen days. Group 3 includes 36 cases subjected to surgical procedure before roentgen therapy, with an average hospitalization of twenty-one days.

Dry dressings only were prescribed in Group 1, chiefly in an attempt to evaluate the efficacy of the roentgen irradiation. In the treatment of Groups 2 and 3, heat in the form of a poultice or heating pad was also employed. The average number of x-ray treatments given was three. Either medium- or high-voltage filtered radiation was employed, depending on the character of the lesion or the apparatus available at the moment.

A brief description of the four fatal cases follows.

*Case 470* The patient, a 52-year-old man, was comatose on admission. An upper-lip lesion had been incised at home by his physician. He received one x-ray treatment but died in 72 hours from meningitis.

*Case 711* The patient, a 45-year-old woman, suffering from diabetes, received three x-ray treatments for a carbuncle on the back of the neck, which was incised. Death occurred from septicemia in 7 days.

*Case 904* The patient, a 36-year-old man with diabetes, was admitted with a carbuncle of the scalp, which had been incised at home. He presented an extensive cellulitis and a positive blood culture on admission. He received two x-ray treatments, but died 34 days after entrance from septicemia.

*Case 1638* The patient, a 60-year-old man with diabetes and a posterior neck lesion, entered with a positive blood culture. He received three x-ray treatments, but died of septicemia 27 days after entrance.

Mitchiner<sup>11</sup> analyzed 240 cases of severe carbuncle admitted to St. Thomas's Hospital from 1928 to 1933. He makes no mention of irradiation. There were 13 deaths, a mortality of 6 per cent. Acute pyemia or septicemia was the cause of death in 11 of the fatal cases. It is more likely to occur, Mitchiner states, if surgical interference is undertaken when the carbuncle is spreading or still unlocalized. Eight of the fatal cases he attributed to this error in treatment. There were 10 diabetic patients in his series, an incidence of 4 per cent and 83 patients with facial carbuncles, an incidence of 34 per cent. "No surgical treatment should be attempted under any conditions,"

he writes, "in facial carbuncles or those complicating diabetes."

In the groups here reported there were 16 diabetic patients, an incidence of 12 per cent. There were 9 diabetic patients in Group 1, 4 in Group 2 and 3 in Group 3 with 1 death in each group from septicemia. While the numbers are small, they permit us to draw the general conclusion that carbuncle in patients with diabetes is a major hazard, but to challenge the oft-quoted dictum "In diabetes the treatment of carbuncles by x-ray without surgery is contraindicated."

The reason for conservatism in the treatment of facial carbuncle, especially that of the lip, is well known. This location is notoriously unfavorable because of the ever-present danger of extension of the thrombophlebitic process "in two directions by way of the nasal veins, the superior labial, the angular vein, and its anastomosis with the superior and inferior ophthalmic veins into the cavernous sinus or by way of the anterior facial vein into the general circulation. The resulting cavernous sinus thrombosis, meningitis, brain abscess or septicopyemia are almost always fatal."<sup>12</sup>

There were 57 cases of facial carbuncle in our series, an incidence of 44 per cent. All received x-ray therapy alone except four of the upper lip cases, 1 of which fell in Group 2, and 3 in Group 3, 1 of the latter terminated fatally.

If conservatism should be used in the treatment of carbuncles in this location, one wonders why surgeons insist on the excision of carbuncles elsewhere, blithely dismissing irradiation, when over and over again one sees abortion of many of the early carbuncles and the breaking down and localization of the more advanced lesions following x-ray treatment.

One of the most satisfying effects of the x-ray therapy of carbuncles is the relief of pain. Occasionally it is aggravated for a few hours, but rarely does it persist for more than from three to nine hours. In our series, when the x-ray consultation was early, as in the Group 1 cases, heat in any form was forbidden so as to have a control series. The Group 1 cases affirm the analgesic effect of the roentgenization of carbuncles—a phenomenon well established in other conditions.

Absorption with exudate with little or no scar ring was the rule when roentgen therapy was given early. Arrest in the spread of the infection was commonly observed even when the treatment was given relatively late. It seems important, however, to use x-ray early and in small doses.

There is good experimental evidence for the employment of x-rays in the treatment of infections. It has been repeatedly shown that relatively enormous doses of x-ray are necessary to

render bacterial cultures inert, but that organisms in living tissue are destroyed by small doses

Businco,<sup>13</sup> in a series of experiments performed on dogs inoculated with typhoid bacilli, found that the irradiated abscesses healed within eight days, while the controls took from twelve to fifteen days to disappear. Histologically the favorable action of the roentgen rays resulted in a marked hyperplasia of the connective tissue, forming a mechanical barrier to the infiltrating and necrosing process.

Freund<sup>14</sup> has demonstrated experimentally that inflammatory cells do not migrate to the site of the inflammation but are formed locally from connective tissue cells in the blood vessels. In his cases roentgen irradiation inhibited exudation and decreased the number of inflammatory cells.

Colwell<sup>15</sup> summarizes the modern concept of many investigators of the action of x-ray in inflammatory lesions as follows:

In localized infection a general consideration of the evidence rather points to a response on the part of the reticuloendothelial system than to leukocyte destruction with consequent liberation of antibodies. This is further corroborated by the fact that chronic infections and more acute infections irradiated in their late stages fail to give the best response. If leukocyte destruction were the most important determining factor, a rapid clearing up of the condition might be expected in the chronic cases. The lack of such reaction perhaps rather indicates local exhaustion of the reticuloendothelial apparatus.

A further point is the necessity for small doses of radiation in the treatment of microbial infections and the observation—which seems established—that heavy

dosage inhibits or destroys the protective effect of the reticuloendothelial system.

#### CONCLUSION

A series of 130 hospitalized cases of severe carbuncle treated by x-ray alone or in conjunction with surgery are presented, with a mortality rate of 3 per cent. There was no death in 57 cases of facial carbuncle treated either alone or chiefly by roentgen therapy. There was no evidence that carbuncle in the diabetic patient was a contraindication to x-ray therapy. The 60 cases treated early by x-ray alone had a shorter convalescence than did the others.

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## REPORT ON MEDICAL PROGRESS

## UROLOGY

WILLIAM C. QUINBY, M.D.\*

THE following is a brief summary of the major advances that have been recently made in urology

## PROSTATECTOMY

There are three types of pathologic change which occur in the prostate which cause obstruction to the outlet of the bladder—simple hyperplasia (often called benign hypertrophy), prostatic carcinoma (sometimes combined with hyperplasia), and median-bar obstructions and those due to hyperplasia of the median lobe.

For removal of the simple hyperplasia, enucleation through a transvesical approach (suprapubic prostatectomy) has been widely used for many years. An approach through the perineum (perineal prostatectomy) carries a lower mortality and also makes possible removal of prostatic carcinoma, which is present in about one fifth of all cases. This type of operation has also been standardized throughout many years. For the median-bar and median-lobe obstructions operation through the urethra, in the former by the use of the punch instrument perfected by Young, has been generally very satisfactory. However, because the original instrument made no provision for the control of bleeding, various modifications (Braasch-Bumpus, Thompson) have been produced which employ one form or another of electric current. With the advent of the electro-surgical cutting current this was adapted to a transurethral instrument (McCarthy) by which tissue can be excised with easy control of bleeding. After the perfection of such instruments steps were soon taken to extend their use to cases of prostatic hyperplasia much more extensive than mere enlargement of the median lobe. It was found that this form of operation made few demands on the patient's strength and therefore carried a low mortality. Convalescence also was definitely shortened. Soon transurethral operation was being advocated for all obstructions caused by the prostate regardless of their nature or type. A wave of enthusiasm followed, largely fostered by the industrious over-advertising of instrument dealers, during which many physicians as well as most of the general public were swept off their feet, hoping that this so-called

"new" method, so different from the earlier "cutting operations," was in truth a panacea.

Sufficient time has now elapsed to permit an unprejudiced survey of the whole field, such as has been the subject of two strikingly important communications read at the last meeting of the American Medical Association. The first, by Davis, presents an analysis of a nation-wide inquiry addressed to over a hundred urologists. It should be closely studied by the whole medical profession, for though dealing specifically with transurethral resection of the prostate, it also contains many wise comments on "the reaction of the medical profession to anything new." Davis outlines by the use of a graphic chart the succeeding stages of this apparently characteristic reaction.

Overenthusiasm [he says] inevitably follows the discovery of a new therapeutic agent, particularly that discovery which tends to be startling or which carries with it a dramatic appeal. After overenthusiasm, in varying degree but in definite sequence, come publicity, commercial exploitation, incompetence and abuse, followed by poor results, recognition of defects and dangers, fear, decreased use and overcorrection, until finally such merits as may exist become recognized in their true light and the new therapeutic agent (drug or surgical method) reaches stability at its proper level of usefulness.

Davis's conclusions are of course that removal of the prostate by the transurethral route is far from being a panacea. About 80 per cent of urologists believe in adapting the form of operation to the conditions presented by the patient. "A skillful few, however, rather than fit the operation to the patient have succeeded in fitting the patient to the surgeon."

One point which comes clearly out of a present-day study of the transurethral method is that it is distinctly *not* an operation to be done by the occasional operator, for all good or even passable results depend on a most exact and extensive familiarity with the bladder outlet and the changes caused in it by the various types and forms of prostatic hyperplasia, as well as on a high degree of manipulative skill. Such familiarity and experience can only be acquired by those relatively few urologists who are associated with a large clinic.

The second communication on this subject is that of Hinman. After discussing the three types

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of obstruction to urination by the prostate,—median bar, hyperplasia and cancer,—he points out that of the three methods of surgical approach—the suprapubic, perineal and transurethral—the perineal alone enables a logical attempt to be made toward the entire enucleation of malignancy. Since cancer of the prostate is the underlying cause of the prostatism in about 1 case out of every 5, a strong argument in favor of the perineal approach exists. As to the relative claims of each of the three methods of attack, Hinman says that the suprapubic approach is suitable for hyperplasia, and is rarely if ever used for removal of a median bar or for cancer except unintentionally when the neoplasm is concealed within hyperplasia. The surgical risk is high, the mortality being between 4 and 20 per cent, with an average of 8 per cent. The period in the hospital is relatively long—from thirty to forty days. As a rule the functional results are both good and permanent.

The perineal operation is difficult to master, and the functional risk in the hands of the inexperienced surgeon is high. The hospital stay averages twenty-one days. The risk is low, the mortality being between 1 and 8 per cent, with an average of 3 per cent. Also, this is the only operative approach which results in the cure of cancer.

The transurethral approach, according to Hinman, is most popular and its greatest fault lies in its very popularity. The mortality varies from 1 per cent in the hands of the expert to as high as 30 per cent or more. The average mortality is probably about 4 per cent. Even when the operation is well done, recurrence is frequent, and of course no attempt is made by this procedure to control cancer.

At the clinic of the Peter Bent Brigham Hospital we have been convinced for at least a decade that the approach to the prostate through the perineal route is by far the most logical one, and is followed by the best results as regards both function and mortality. Especially is this true in cases in which the prostate is carcinomatous, for when the gland is thus exposed, accurate judgment of the extent and position of the malignancy becomes possible. Because of the customary late recognition of prostatic cancer it is often impossible to excise all the malignancy, even by a total prostatectomy. But by the entirely adequate exposure through the perineum it is always possible to free the outlet of the bladder by excision of the growth in this region, after which radon seeds can be used in those areas which cannot be removed. Progressive growth of the carcinoma after such a palliative operation is often quite slow, patients not infrequently retaining good general

health and a satisfactory bladder function for from two to four years.

The transurethral operation in our hands has been confined for the most part to benign median-bar and middle-lobe obstructions and to benign hyperplasias of lateral and median lobes of such size that a complete enucleation of all hyperplastic tissue seemed possible at a single operative session. It has been well recognized, ever since the earlier days in which the electrocautery of Bottini was used, that the removal of tissue in the floor of the prostatic urethra in the form of a gutter or groove is entirely inadequate; the bladder cannot be completely emptied, infection persists or increases and the patient is not cured. Therefore a transurethral attack on a hyperplastic obstructing prostate cannot be conscientiously adopted by the surgeon unless he is certain that he will be able to remove practically all the hyperplastic tissue. It is largely due to a lack of appreciation of this need that we have seen so many poor results after an attempted resection through the urethra. For to remove the necessary amount of tissue of the larger glands requires an extensive and complete familiarity with the prostatic portion of the urethra and the changes in its appearance caused by the hyperplasia. This demands good vision at all stages of the operation, to be obtained only by adequate control of bleeding. The Braasch-Bumpus punch, seen in its latest form in the instrument of Thompson, is doubtless the best in that there is no devitalized or cauterized tissue left after operation to act as a frequent cause of late bleeding on the separation of the sloughs. The proper use of this instrument requires much practice, however, especially by those surgeons who have not had experience in vision through an instrument devoid of lenses. The McCarthy instrument, in which the cutting is done by an electric current of high frequency, is easier to use on the whole, but because the character and modalities of the electric current with its especial generator must be accurately adjusted, one finds only too often difficulty in controlling bleeding or in cutting cleanly without causing cauterization and its attendant dangers from secondary hemorrhage.

Everyone familiar with the present developments of the transurethral operation must appreciate that in spite of its failures and shortcomings in the past, it represents in proper hands today one of the outstanding accomplishments of urology. In reality, the only remaining difference in opinion lies in the decision as to what types of obstructing prostate should be so attacked. This aspect would seem to be most adequately covered by the summary of Davis above quoted, in which

it was found that the large majority of surgeons practice careful selection of the cases which in their hands seem suited to transurethral surgery.

In summary, therefore, present-day opinion may be stated as follows

(1) Suprapubic prostatectomy is technically simple. It is probably the only type of operation which should be undertaken by the occasional surgeon. Its mortality is higher than after other types of operation, and the convalescence longer, but its results in general are both good and permanent.

(2) Perineal prostatectomy is technically exacting on the surgeon but less so on the patient. It should not be undertaken without a detailed familiarity with the anatomy of the perineum, which can be acquired only by extensive experience. Its mortality is very low, and it is the only route by which carcinoma can be adequately controlled. It is the operation of choice in many clinics.

(3) The transurethral operation, though seemingly simple, is in reality harder to execute than either of the other forms when applied to obstruction by the prostate caused by factors other than hypertrophy of the middle-lobe or median bar. Its indiscriminate use has doubtless done much harm, which to some extent has obscured its real worth. It entirely omits from consideration the important and frequent cases of prostatic cancer. A second operative session is quite often necessary. The procedure carries a very low mortality and short convalescence, but its results are invariably poor unless all or nearly all the hyperplastic tissue is removed and hemostasis is accurately and completely obtained. In order to achieve this result an extensive training is imperative.

#### UNILATERAL RENAL DISEASE AND HYPERTENSION

The association of various forms of renal disease with general circulatory hypertension has long been of much interest to clinicians. Intrinsic renal disease of a diffuse type, as in vascular nephritis and pyelonephritis, is commonly accompanied by hypertension at some period in the progress of such disease. The general belief in the past, however, has been that a bilateral renal abnormality must exist in such cases. Recently work which has accumulated from experimental laboratories has demonstrated beyond question that arterial hypertension can be produced in animals by various methods which interfere with the renal blood supply of only one kidney. The most generally successful method has been that of Goldblatt, who has devised a clamp by which partial constriction of the renal artery can be made. As a result of the ischemia produced by such a clamp

a persisting hypertension appears, even though one kidney is allowed to remain normal. Following removal of the occluding clamp or excision of the kidney so treated, the blood pressure returns to normal.

This is not the place to undertake a discussion of the considerable volume of work which has been devoted to this subject, nor of the present attempts to describe the cause of the hypertension so produced. The important aspect for the urologist lies in the clear demonstration of the fact that such hypertension can be present even in unilateral renal disease. For if cases of this kind are to be found in the clinic, it is fair to assume that cure of the vascular manifestations may follow a nephrectomy. This has in fact been found to be so, and during the past year several papers have been published in which such cases are described. Leadbetter and Burkland's case was that of a colored boy of five and a half years who had had hypertension from the age of six months. There was enlargement of the heart and an ectopic right kidney, without evidence of infection. The average blood pressure was about 152 systolic, 90 diastolic. There were no abnormalities of the eye grounds. After nephrectomy, at which the ectopic kidney was found alongside the right iliac artery, the blood pressure fell immediately to 125 systolic, 92 diastolic, and after discharge it was 96 systolic, 70 diastolic. Examination of the kidney showed no evidence of infection, but the lumen of the renal artery was almost occluded by a tissue plug made up of smooth muscle, considered by the authors to represent an anomaly of development.

Six cases of hypertension in the presence of unilateral renal lesions of the infective type are related in the communication of Crabtree. In all there was hypertension which fell noticeably after nephrectomy. Boyd and Lewis report a further case in which the blood pressure became normal after nephrectomy for renal infarct.

It appears that in view of this undoubted close relation between certain renal conditions and the phenomena of general vascular hypertension, all patients should be investigated by detailed urological methods before being subjected to any one of the various forms of surgical operation designed to relieve their hypertension, such as sympathectomy, section of anterior nerve roots and adrenal denervation.

#### RENAL INFECTIONS

Progress in the control of renal infections has been made along several lines during the last year or two. It is generally known today that each case of infection must be closely studied in order

to determine and remove the source or cause of such infection if possible. Of equal importance is the demonstration of the presence or absence of any factor in the urinary tract which may act to cause stasis. Only after removal or correction of such mechanical cause can one hope to combat successfully the attendant infection. For instance, it is practically impossible to bring about sterilization of the urine when a kidney bears a stone, or when the stone lies in the ureter and thus causes stasis in the passages above it. After such a mechanically obstructing cause has been removed or proved to be absent, the infection can be fought by one or another of the various antiseptic substances, especially mandelic acid or sulfanilamide. Also, it is to be again emphasized that the criterion of cure of any urinary infection should always be a sterile culture of the urine drawn under aseptic precautions, for it has been shown repeatedly that the absence of pus cells and of symptoms is not enough. Treatment must be continued till the urine is sterile, in order to avoid recurrence.

In a recent article Braasch discusses this subject. He first notes the three types of pyelonephritis. The first (the so-called "acute pyelitis" of earlier days), coming as an acute attack of relatively short duration, is very common, possibly standing next in frequency to the infections of the respiratory tract. He writes

The medicine we give these patients is often given credit for clearing up infection which in reality has been overcome by natural resistance. However, when the infection persists longer than four or five days and when it is accompanied by fever and chills, nature is materially aided by the administration of any of the various chemotherapeutic agents now available.

The second type is characterized by recurring attacks of acute infection lasting possibly several weeks and reappearing after variable lapses of time. In practically all such cases, though the patient seems well, the urine does not become sterile between attacks, and some mechanical condition in the urinary tract which induces stasis may be present.

The third type of pyelonephritis is its chronic form. Braasch includes under this heading those cases in which the infection has persisted for at least a year and in which, with rare exception, both kidneys are involved. He notes that when only one kidney is found to be infected over a long period of time, a secondary complication should be assumed, usually requiring surgical treatment. Though some patients may acquire a relative im-

munity to such infection, in others secondary complications are common, such as stone formation, hematuria or pyonephrosis due to a cicatricial deformity.

Of the two drugs today most potent in fighting such infections, mandelic acid is of most use in infections caused by *Streptococcus faecalis*. This drug is usually only effective when the urine is made highly acid by the administration of ammonium chloride, and this condition may be difficult or impossible to bring about. Sulfanilamide is particularly efficient in combating urinary infections due to the colon bacillus and the proteus bacillus. Braasch believes that there is no doubt that sulfanilamide and its derivatives have already reduced the occurrence of chronic pyelonephritis and even bid fair to eliminate it. He finds that large doses of sulfanilamide are frequently unnecessary in infection of the urinary tract, and that small doses—sometimes as little as 1 gm daily, given continuously—are of distinct value.

With the increasing efficacy of chemotherapy it may be predicted that primary pyelonephritis will ultimately be largely limited to its acute and subacute stages and that chronic infections will develop only occasionally.

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# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25221

### PRESENTATION OF CASE

A fifty-four-year-old married Italian shoemaker was admitted complaining of abdominal swelling and edema of the legs.

Four years prior to admission the patient noted a gradual darkening of his skin and at the same time a progressively increasing shortness of breath following mild exertion. One year later he began to suffer from a dull nonradiating pain in his right side just under the costal margin. Eight months before entry his ankles became swollen each evening but were normal in the morning. During the succeeding four months the swelling gradually extended upward to the knees, thighs and genitalia. His abdomen then became enlarged quite rapidly. The pain in the right upper quadrant became more severe. He rapidly lost weight and strength and could no longer work. Dyspnea increased and severe orthopnea developed. At about this time he first noted the presence of small amounts of bright-red blood in his stools and felt a small mass at the anus following defecation. His physician gave him arm injections and did about fifteen abdominal taps at weekly intervals. At each tap "about two bucketfuls" of fluid were removed. He had had neither melena, hemoptysis nor diarrhea. There was no pruritus, and he had noted no change in the color of his eyes. He denied the use of alcohol in any form. Appendectomy and cholecystectomy had been done at some unknown period in the past.

Physical examination showed a cachectic moribund man with marked ascites and edema of the legs. The skin was deeply bronzed and the sclerae appeared to be jaundiced. There was no pigmentation of the buccal mucous membrane. Over the neck and chest there were a few spider-like telangiectases. The neck veins were full and showed visible pulsations. There was marked clubbing of the fingers. Examination of the chest showed subcrepitant rales over both lung bases posteriorly. The lungs were resonant throughout except for slight dullness at the right base posteriorly. Examination of the heart was negative. The blood pressure was 96 systolic, 60 diastolic. The abdomen was distended, and a fluid wave was elicited. The superficial veins were dilated, and

extended up over the chest. Prominent veins were also evident in the axillary regions. A firm, nodular, slightly tender liver edge was palpated 2 cm below the right costal margin, extending from the right midclavicular line to the xiphoid process. No other organs or masses were palpable. The genitalia were edematous. Rectal examination revealed tender hemorrhoids. The reflexes were sluggish but equal.

The temperature was 99.5°F rectally, the pulse 110, and the respirations 30.

Examination of the urine showed a specific gravity of 1.026, a red test with Benedict's solution (following intravenous glucose), 5 to 8 white cells and 10 to 20 red cells per high-power field, no albumin, no bile and no casts. The test for urobilinogen was positive in dilution of 1:40, and doubtful at 1:80, a normal control was positive at 1:20 only. No acetone bodies were present. The blood showed a red-cell count of 3,480,000 with 81 per cent hemoglobin, and a white-cell count of 10,640 with 91 per cent polymorphonuclears. The hematocrit was 36.3. The nonprotein nitrogen of the serum was 21 mg per 100 cc, the protein 5.9 gm and the van den Bergh 1.5 to 2.0 mg of bilirubin, diphasic. The fasting sugar on whole blood was 141 mg per 100 cc. A capillary sugar tolerance test showed a fasting blood sugar of 84 mg per 100 cc, after a half hour 118 mg, after one and a half hours 174 mg, after three hours 240 mg, after four hours 244 mg, and after five hours 194 mg. The fasting blood sodium was 137 milliequivalents per liter. The bleeding time was 2½ minutes, the clotting time 13 minutes, the clotting began in 6 minutes. A blood Hinton test was negative. A bromsulfalein liver function test showed 0 to 5 per cent retention. A Takata-Ara test was strongly positive. A formol-gel test was positive and indicated that the globulin was approximately 5 per cent. Several stool examinations were guaiac negative. An electrocardiogram showed a P-R interval of 0.14 seconds, normal rhythm, flat T<sub>1</sub>, low T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, and low voltage in the QRS complexes. A special stain on a skin biopsy was negative for iron. An abdominal paracentesis yielded 8000 cc of clear, straw-colored fluid with a specific gravity of 1.008.

An x-ray film of the chest showed scarring of both apices and a fine miliary mottling involving the entire lung, being particularly marked in both lower lung fields where there was questionable confluence of some foci. The mottling seemed to have a bronchial distribution. Emphysematous blebs were thought to be present bilaterally but were particularly evident in the left upper lung field. The heart shadow was not remarkable.

On the second hospital day, before intravenous

glucose had been given, the urine showed a yellow test with Benedict's solution. On the fifth hospital day 5000 cc. of clear, light amber fluid was removed from the abdominal cavity by paracentesis, the specific gravity was 1.008. His condition grew progressively worse, and the abdomen rapidly refilled. On the twelfth hospital day 5000 cc. of straw-colored fluid was again removed. The patient refused to take food. His temperature remained essentially normal, the pulse was about 100, and the respirations 20. He gradually failed, and died on the eighteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. JOHN H. TALBOTT. The first time that I read this record the diagnosis was fairly obvious, the second time not quite so obvious, and at the third reading I was thoroughly convinced that the house staff probably puzzled as much over the diagnosis as I have. The patient was fifty-four years of age and an Italian. Dr. Wyman Richardson has called our attention to the fact that cirrhosis of the liver is common in Italians. The patient's first symptom, darkening of the skin, was noted four years prior to admission. Pigmentation of the type described may be observed in four or five different diseases. The first dyscrasia that one thinks about is Addison's disease. Undoubtedly the physicians in charge of this man thought very seriously of a diagnosis of Addison's disease for they requested a serum sodium determination. The concentration was 137 milliequivalents per liter. This is a relatively normal value. I do not believe this patient had Addison's disease in spite of the fact that there was some hypotension and pigmentation of the skin. It is specifically stated that there was no pigmentation of the mucous lining of the mouth. If this patient had had chronic Addison's disease as opposed to acute adrenal insufficiency, he should have had pigmentation in the mouth. At the present time I am not justified in making a diagnosis of chronic Addison's disease without it.

The pain in the right upper quadrant is at least consistent with cirrhosis of the liver. When I use the term cirrhosis of the liver I mean "sclerosis" without etiologic implications, at least not until I summarize the case. There may be sufficient pain from cirrhosis of the liver to warrant surgical consultation, and not infrequently surgical intervention is advised. The anal mass was probably due to hemorrhoids. The small amount of bright-red blood in the stools confirms this impression. The patient was tapped fifteen times before admission and three times afterward. Recurring ascites is not in itself diagnostic as there are several conditions that may require fre-

quent tapping. The injections in the arm were possibly Salvirgan, which is an effective diuretic.

The patient denied the use of alcohol. We do not hesitate, however, to make a diagnosis of alcoholic cirrhosis of the liver in a patient who has a similar negative history. Patients who consume alcohol frequently will not give a correct story.

The skin was deeply bronzed. This is significant. In hemochromatosis or "bronze diabetes," pigmentation of the skin is characteristic. The pigmentation is a blue slate or lead color in contrast to the silver sheen of argyria. In Addison's disease the pigmentation is brown without a metallic tinge.

There were a few spider telangiectases. This is consistent with the diagnosis of intrahepatic disturbance, and nothing more.

The neck veins were full and showed visible pulsation. I should like to attribute these to ascites, and shall not discuss them further.

There was marked clubbing of the fingers. That is an interesting finding. Four or five years ago Dr. Francis M. Rackemann asked me to see a patient with clubbing of the fingers, some respiratory disturbance and unsaturation of the arterial blood. I raised the question of congenital heart disease. Three years later the patient died from cirrhosis of the liver. The oxygen unsaturation which accompanies cirrhosis of the liver is something that has been appreciated in the past three or four years only. Snell<sup>1</sup> at the Mayo Clinic found that 50 or 60 per cent of the cases of cirrhosis of the liver had a saturation of the arterial blood as low as 80 per cent. We occasionally see patients with cirrhosis of the liver who have clubbing of the fingers. I wonder whether the oxygen unsaturation we see frequently associated with cirrhosis of the liver may not be the mechanism of the clubbing of the fingers, which is only infrequently observed in this disturbance. This may be associated with a dysfunction of hemoglobin formation. It is possible that a change in the nature of normally occurring hemoglobin may be the precursor of the pigmentary changes that we see in hemochromatosis, which only rarely follows cirrhosis of the liver. I shall say more about this later.

The question of constrictive pericarditis might be raised, but I think it can be dismissed without further discussion. No spleen was palpable. The patient had ascites at the time they looked for the spleen, and I am wondering if subsequently, after tapping, the spleen was palpable.

The change in the liver is interesting. According to the description the subdiaphragmatic enlargement began in the midclavicular line and went over past the navel process, that is, the

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glucose had been given, the urine showed a yellow test with Benedict's solution. On the fifth hospital day 5000 cc of clear, light amber fluid was removed from the abdominal cavity by paracentesis, the specific gravity was 1.008. His condition grew progressively worse and the abdomen rapidly refilled. On the twelfth hospital day 5000 cc. of straw-colored fluid was again removed. The patient refused to take food. His temperature remained essentially normal, the pulse was about 100, and the respirations 20. He gradually failed, and died on the eighteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. JOHN H. TALBOTT: The first time that I read this record the diagnosis was fairly obvious, the second time not quite so obvious, and at the third reading I was thoroughly convinced that the house staff probably puzzled as much over the diagnosis as I have. The patient was fifty-four years of age and an Italian. Dr. William Richardson has called our attention to the fact that cirrhosis of the liver is common in Italians. The patient's first symptom, darkening of the skin, was noted four years prior to admission. Pigmentation of the type described may be observed in four or five different diseases. The first dyscrasia that one thinks about is Addison's disease. Undoubtedly the physicians in charge of this man thought very seriously of a diagnosis of Addison's disease for they requested a serum sodium determination. The concentration was 137 milliequivalents per liter. This is a relatively normal value. I do not believe this patient had Addison's disease in spite of the fact that there was some hypotension and pigmentation of the skin. It is specifically stated that there was no pigmentation of the mucous lining of the mouth. If this patient had had chronic Addison's disease as opposed to acute adrenal insufficiency, he should have had pigmentation in the mouth. At the present time I am not justified in making a diagnosis of chronic Addison's disease without it.

The pain in the right upper quadrant is at least consistent with cirrhosis of the liver. When I use the term cirrhosis of the liver I mean "sclerosis" without etiologic implications, at least not until I summarize the case. There may be sufficient pain from cirrhosis of the liver to warrant surgical consultation, and not infrequently surgical intervention is advised. The anal mass was probably due to hemorrhoids. The small amount of bright-red blood in the stools confirms this impression. The patient was tapped fifteen times before admission and three times afterward. Recurring ascites is not in itself diagnostic as there are several conditions that may require fre-

quent tapping. The injections in the arm were possibly Salvirgan, which is an effective diuretic.

The patient denied the use of alcohol. We do not hesitate, however, to make a diagnosis of alcoholic cirrhosis of the liver in a patient who has a similar negative history. Patients who consume alcohol frequently will not give a correct story.

The skin was deeply bronzed. This is significant. In hemochromatosis or "bronze diabetes," pigmentation of the skin is characteristic. The pigmentation is a blue slate or lead color in contrast to the silver sheen of argyria. In Addison's disease the pigmentation is brown without a metallic tinge.

There were a few spider telangiectases. This is consistent with the diagnosis of intrahepatic disturbance, and nothing more.

The neck veins were full and showed visible pulsation. I should like to attribute these to ascites, and shall not discuss them further.

There was marked clubbing of the fingers. That is an interesting finding. Four or five years ago Dr. Francis M. Rackemann asked me to see a patient with clubbing of the fingers, some respiratory disturbance and unsaturation of the arterial blood. I raised the question of congenital heart disease. Three years later the patient died from cirrhosis of the liver. The oxygen unsaturation which accompanies cirrhosis of the liver is something that has been appreciated in the past three or four years only. Snell<sup>1</sup> at the Mayo Clinic found that 50 or 60 per cent of the cases of cirrhosis of the liver had a saturation of the arterial blood as low as 80 per cent. We occasionally see patients with cirrhosis of the liver who have clubbing of the fingers. I wonder whether the oxygen unsaturation we see frequently associated with cirrhosis of the liver may not be the mechanism of the clubbing of the fingers, which is only infrequently observed in this disturbance. This may be associated with a dysfunction of hemoglobin formation. It is possible that a change in the nature of normally occurring hemoglobin may be the precursor of the pigmentary changes that we see in hemochromatosis, which only rarely follows cirrhosis of the liver. I shall say more about this later.

The question of constrictive pericarditis might be raised, but I think it can be dismissed without further discussion. No spleen was palpable. The patient had ascites at the time they looked for the spleen, and I am wondering if subsequently, after tapping, the spleen was palpable.

The change in the liver is interesting. According to the description the subdiaphragmatic enlargement began in the midclavicular line and went over past the xiphoid process, that is, the

# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25221

### PRESENTATION OF CASE

A fifty-four-year-old married Italian shoemaker was admitted complaining of abdominal swelling and edema of the legs.

Four years prior to admission the patient noted a gradual darkening of his skin and at the same time a progressively increasing shortness of breath following mild exertion. One year later he began to suffer from a dull nonradiating pain in his right side just under the costal margin. Eight months before entry his ankles became swollen each evening but were normal in the morning. During the succeeding four months the swelling gradually extended upward to the knees, thighs and genitalia. His abdomen then became enlarged quite rapidly. The pain in the right upper quadrant became more severe. He rapidly lost weight and strength and could no longer work. Dyspnea increased and severe orthopnea developed. At about this time he first noted the presence of small amounts of bright-red blood in his stools and felt a small mass at the anus following defecation. His physician gave him arm injections and did about fifteen abdominal taps at weekly intervals. At each tap "about two bucketfuls" of fluid were removed. He had had neither melena, hemoptysis nor diarrhea. There was no pruritus, and he had noted no change in the color of his eyes. He denied the use of alcohol in any form. Appendectomy and cholecystectomy had been done at some unknown period in the past.

Physical examination showed a cachectic moribund man with marked ascites and edema of the legs. The skin was deeply bronzed and the sclerae appeared to be jaundiced. There was no pigmentation of the buccal mucous membrane. Over the neck and chest there were a few spider-like telangiectases. The neck veins were full and showed visible pulsations. There was marked clubbing of the fingers. Examination of the chest showed subcrepitant rales over both lung bases posteriorly. The lungs were resonant throughout except for slight dullness at the right base posteriorly. Examination of the heart was negative. The blood pressure was 96 systolic, 60 diastolic. The abdomen was distended, and a fluid wave was elicited. The superficial veins were dilated, and

extended up over the chest. Prominent veins were also evident in the axillary regions. A firm, nodular, slightly tender liver edge was palpated 2 cm below the right costal margin, extending from the right midclavicular line to the xiphoid process. No other organs or masses were palpable. The genitalia were edematous. Rectal examination revealed tender hemorrhoids. The reflexes were sluggish but equal.

The temperature was 99.5°F rectally, the pulse 110, and the respirations 30.

Examination of the urine showed a specific gravity of 1.026, a red test with Benedict's solution (following intravenous glucose), 5 to 8 white cells and 10 to 20 red cells per high-power field, no albumin, no bile and no casts. The test for urobilinogen was positive in dilution of 1:40, and doubtful at 1:80, a normal control was positive at 1:20 only. No acetone bodies were present. The blood showed a red-cell count of 3,480,000 with 81 per cent hemoglobin, and a white-cell count of 10,640 with 91 per cent polymorphonuclears. The hematocrit was 36.3. The nonprotein nitrogen of the serum was 21 mg per 100 cc, the protein 5.9 gm and the van den Bergh 1.5 to 2.0 mg of bilirubin, diphasic. The fasting sugar on whole blood was 141 mg per 100 cc. A capillary sugar tolerance test showed a fasting blood sugar of 84 mg per 100 cc, after a half hour 118 mg, after one and a half hours 174 mg, after three hours 240 mg, after four hours 244 mg, and after five hours 194 mg. The fasting blood sodium was 137 milliequivalents per liter. The bleeding time was 2½ minutes, the clotting time 13 minutes, the clotting began in 6 minutes. A blood Hinton test was negative. A bromsulfalein liver function test showed 0 to 5 per cent retention. A Takata-Ara test was strongly positive. A formol gel test was positive and indicated that the globulin was approximately 5 per cent. Several stool examinations were guaiac negative. An electrocardiogram showed a P-R interval of 0.14 seconds, normal rhythm, flat T<sub>1</sub>, low T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, and low voltage in the QRS complexes. A special stain on a skin biopsy was negative for iron. An abdominal paracentesis yielded 8000 cc of clear, straw-colored fluid with a specific gravity of 1.008.

An x-ray film of the chest showed scarring of both apices and a fine miliary mottling involving the entire lung, being particularly marked in both lower lung fields where there was questionable confluence of some foci. The mottling seemed to have a bronchial distribution. Emphysematous blebs were thought to be present bilaterally but were particularly evident in the left upper lung field. The heart shadow was not remarkable.

On the second hospital day, before intravenous



tuberculous chronic infection with generalized fibrosis?

DR. HOLMES Yes

DR. TALBOTT In the first place, I do not believe that this man died of a lung condition. I believe that he had a cirrhosis of the liver, and that he died of hepatic insufficiency. I am going to spend a little time discussing the various types of hepatic disturbance that he might have had.

He had an enlargement between the right and left lobe. There is little evidence, so far as the abdominal picture is concerned, that he had malignant disease. I cannot believe he had fifteen or sixteen tapplings of clear fluid from a malignancy alone. There is little evidence that this is an echinococcus cyst. Against liver abscess is the fact that he had no fever at any time. He may have had fever in the past, but he certainly did not in the hospital. If this is syphilitic cirrhosis, I should like to have more evidence of it in the clinical picture, such as a past history of exposure—but I must admit the past history is not reliable—or signs and symptoms of syphilis elsewhere. If we had seen him earlier in the disease we might have given potassium iodide to note whether he responded to therapy in the way that a patient with syphilitic cirrhosis should. On the evidence at hand I do not feel justified in making a diagnosis of hepatic lobatum or syphilitic cirrhosis of the liver. I do not believe that he had diabetes mellitus or that he died in diabetic coma. We have one negative skin biopsy. So far as hemochromatosis is concerned, he had pigmentation and cirrhosis. If he did have hemochromatosis it was of a very mild degree, such as one occasionally sees in patients with cirrhosis of the liver, and had not developed sufficiently to permit a clinical diagnosis or to allow the pathologist to comment on it other than to say that it was a very early form. I might mention acanthosis nigricans, which is associated with pigmentation of the skin. There is little to justify a serious consideration of this diagnosis.

With a negative past history, I do not see how I am able to make a clinical diagnosis of what is going on in the chest. The x-ray films have not helped us except to exclude certain conditions. It is not a very obvious diagnosis and I shall have to leave it undiagnosed. We are then left with the diagnosis of cirrhosis of the liver, which I think was probably alcoholic in origin. I should be more cautious, probably, and call it idiopathic cirrhosis of the liver. I think that he died of hepatic insufficiency.

DR. PAUL D. WHITE This man came to the East Medical Service while I was visiting. I admire Dr. Talbott's discussion of the case. He

has ably expressed our own confusion as we took up one point after another. We tried very hard to make a diagnosis of hemochromatosis but were not successful.

We were very much interested in the relation of the clubbing of the fingers to the pulmonary disease, aside from the possible effect of the cirrhosis of the liver. The statement that Dr. Talbott made about the visible neck-vein pulsation was, I think, very wise. There is no indication, of course, that, with a small and apparently normal heart, cardiac failure would be responsible for such a pulsation. This pulsation was not marked. It can be accounted for, I am sure, by the pressure from a large amount of ascites. Recently, in the past year or so, I have observed a slight jugular pulsation just above the right clavicle even in normal individuals who are very short and whose diaphragms are high. The venous pressure in such cases is normal, even though one can see the jugular pulse.

The electrocardiogram in this case is not particularly helpful. It may mean coronary disease, which need not enter the clinical picture, or a toxic condition and nothing else.

DR. DONALD KING I saw the x-ray films when this patient was on the ward. We raised the question as to whether this might have been a case of dilatation of the bronchioles rather than of the larger bronchi. The honeycomb lesions shown in the films are much like those which have been present in one or two cases of pulmonary fibrosis with bronchiectasis, and in these cases autopsy has shown marked dilatation of the bronchioles.

#### CLINICAL DIAGNOSES

Cirrhosis of liver

Gastric ulcer

Pulmonary fibrosis

#### DR. TALBOTT'S DIAGNOSES

Cirrhosis of liver (? alcoholic)

Undiagnosed lesion in the lungs

#### ANATOMICAL DIAGNOSES

Cirrhosis of the liver, alcoholic type

Pulmonary fibrosis

Emphysema

Bronchiolectasis

Pulmonary edema

Bronchopneumonia

Gastric ulcer, active

Duodenal ulcer, healed

Ascites

Arteriosclerosis

Operative wounds cholecystectomy and appendectomy

enlargement occurred where a middle lobe might be. Many years ago McCrae and Caven<sup>2</sup> called attention to the fact that syphilis of the liver was frequently associated with left-lobe involvement.

The patient had a positive sugar test in the urine on one occasion before any glucose had been given, and again after it had been given internally. The sugar-tolerance curve is not very convincing. We have been studying sugar tolerance in a good many patients with various disturbances, particularly gout, and frequently we find a curve, quite like this, with prolonged elevation. It may remain elevated as high as 200 or 250 mg per 100 cc for three, four or five hours, and we are rather certain that most of these patients do not have diabetes mellitus. Furthermore I do not believe we have anything in the history that justifies our making a diagnosis of diabetes mellitus. The presence of a small amount of sugar in the urine in a patient who has obvious intrahepatic damage can be explained on that basis alone. Lastly, there were no acetone bodies in the urine, and I do not interpret the terminal event as diabetic acidosis and coma.

The blood Hinton test was negative. I mentioned previously that there may be enlargement of the left lobe of the liver in syphilitic cirrhosis, but I hesitate to disregard the negative blood test. I should have been pleased if we had had a Wassermann or Hinton test on the ascitic fluid. That was not done. The bromsulfalein liver test was 0 to 5 per cent retention. This is normal. The Takata-Ara and the formol-gel tests were positive. These are indications of an increase in serum globulin. There has been considerable interest in the past four or five years in the pathologic conditions which are associated with an increased globulin or pseudoglobulin reaction. The three conditions most frequently encountered in which a concentration greater than 40 gm per 100 cc is observed, are multiple myeloma, lymphogranuloma inguinale and cirrhosis of the liver. The first two I am not going to consider. In the third condition the increase may be a combination of two factors. I have just mentioned that a disturbance of formation of hemoglobin and resulting change in the nature of hemoglobin probably occur in cirrhosis. An increase in globulin may be associated with a related intrahepatic dysfunction. A loss of albumin in ascitic fluid with a stress on the protein-forming mechanism is the second factor.

Should we consider malignancy in this patient? The stool examination was negative for blood. There was no hemoptysis, no hematemesis, and the patient passed no large amount of fresh blood by rectum.

The electrocardiogram is of little help to me.

A special stain was done on a skin biopsy. Apparently they were looking for hemochromatosis. However, we do see patients with hemochromatosis in whom the biopsy is negative. Again, this negative test is of no help. I should have preferred either two or three negatives or one positive.

The abdominal paracentesis yielded a fluid with a specific gravity of 1.008, which indicates a transudate and not an exudate.

The interpretation of the x-ray films of the chest is most unsatisfactory to me. Perhaps Dr. Holmes will help with the diagnosis.

DR. GEORGE W. HOLMES: These films show an obvious extensive process involving both lung fields. It is rather generalized, a little more marked at the bases. We have observations on February 6 and on February 13 which show practically no change in the appearance of the chest. Between February 13 and 24, however, there is a very marked change, a difference in the whole character of the picture. It is interesting that his heart is within normal limits both as to size and shape and stays that way, so far as I can determine, throughout the stay in the hospital. He has some tortuosity of the aorta. The whole picture does not seem to be in any way connected with the vascular system. The process itself could be due to a number of diseases. It is not suggestive of tuberculosis but could be due to metastatic malignant disease, to some fungous infection or to one of the unusual forms of peribronchial disease. The terminal picture, I think, is due to edema or pneumonia on top of the previous process. Would you like to have me go farther?

DR. TALBOTT: May I ask a question? Does it look anything like a generalized syphilitic lesion?

DR. HOLMES: I do not know of any generalized syphilitic lesion that would look like that.

DR. TALBOTT: Could leukemia give a picture comparable to this?

DR. HOLMES: It is very unlikely.

DR. TALBOTT: It has been described but we have not been fortunate in seeing it. Possibly we do not consider it so frequently as we should.

DR. HOLMES: That is probably true.

DR. TALBOTT: The only symptoms that were referable to the chest were dyspnea and orthopnea. He had no cough or fever at any time.

DR. HOLMES: It seems strange he did not have cough. I should be inclined to interpret that the way you did the story about alcohol. He must have had some cough. I cannot differentiate the things that I have named.

DR. TALBOTT: Could it be idiopathic or non-

temperature going to 105.6°F. During the night the temperature dropped to normal, where it remained. She was prostrated but had no complaints and no abnormal physical signs. The next day she had oliguria despite a fluid intake of 3000 cc. Sulfanilamide therapy was stopped, the blood level being 14 mg per 100 cc. Her blood pressure was 95 systolic, 60 diastolic. There were several loose stools. She had become nauseated. The non-protein nitrogen of the blood serum was 142 mg per 100 cc. On the following day her blood pressure was 95 systolic, 60 diastolic, becoming 105 systolic, 50 diastolic after two doses of coramine by mouth. She continued passing only small amounts of urine of a low specific gravity. Her temperature was normal. On the tenth hospital day she remained drowsy and vomited small amounts. At this time she was quite jaundiced. Her urinary output had risen to 64 ounces. She refused to take anything by mouth. The area of liver dullness was not diminished, nor was there any tenderness in the abdomen. The chest remained clear and the blood pressure steady at 105 systolic, 50 diastolic. Her sulfanilamide blood level was 9 mg per 100 cc., non-protein nitrogen 137 mg per 100 cc., chlorides 446 (as sodium chloride), icteric index 50 to 60. The red-blood-cell count was 2,600,000, the white-blood-cell count 25,500. The smear was not remarkable. She continued rapidly downhill. On the fourteenth hospital day her stomach seemed to be distended and an unsuccessful attempt was made to pass a nasal tube. She rapidly failed and died on the fourteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR WYMAN RICHARDSON: I feel badly about the statement, "well-marked anemia." I do not know whether she looked anemic or not, or whether anyone did the blood count. This is somewhat important, as you will see later on. However, we will take that as it is written.

We have to explain in this patient fever and chills, evidence of renal failure, jaundice, anemia and death. I want to take them up in that order. In the first place, in regard to her sepsis we have no report anywhere in the record of a blood culture or a throat culture. The clinical description of her disease is typical of beta-hemolytic streptococcal throat infection which has been so prevalent in the past few months. The whole story down to her admission to the hospital is one of a hemolytic streptococcal throat infection. The question is, Do we have to go any farther than that in regard to her sepsis? They have ruled out the possibility of a meningitis fairly well by the lumbar puncture. There is nothing in the story to suggest any localizing lesion except the

renal failure and the jaundice, with the possible exception of the to-and-fro scratching sound over the pulmonic area. This, from the description, was more likely some sort of pleuropericardial rub and of no significance. However, we cannot dismiss entirely the possibility that this patient might have had acute bacterial endocarditis to account for some of the sepsis.

In regard to the question of renal failure, she had oliguria and a rapidly rising non-protein nitrogen with, at the same time, a blood pressure which remained low. Little is said about the organized sediment in the urine, which might have been of help. In bacterial endocarditis we frequently have a nephritis which is usually embolic in, I think, 90 per cent of cases, but it may be a true glomerulonephritis in the remaining ten per cent. However, in this case it is very difficult for me to see how the patient would reach this rapid termination in so short a time. Most of them will go on longer. Certainly if it were a focal nephritis from streptococcal infection, again the course would not be so fulminating. I would not expect even acute glomerulonephritis to go to this point so quickly. Nothing is said about hemorrhage from the kidney. It is mainly a matter of anuria for a good many days. I note, however, that her urinary output did increase shortly before death.

Let us leave the discussion of renal failure for a moment and go on to the symptom of jaundice. She had a large amount of sulfanilamide which was trapped in the blood stream when the kidneys shut down and remained there for six or seven days. She is entitled to have a hemolytic type of anemia from sulfanilamide. In such a case one would expect to find in the blood smear more evidence of red-cell regeneration, although it is possible that sepsis may inhibit the bone-marrow response. The cases of hemolytic anemia from sulfanilamide that I have seen have shown obvious evidence of red-cell regeneration on examination of the smear. However, if she did have hemolytic anemia from sulfanilamide she is entitled to a small amount of icterus but not an icteric index of 50 or 60, if we can take that as accurate.

Another thing we have to consider is toxic hepatitis on the basis of either infection or sulfanilamide. I do not know of any case of real toxic hepatitis as a result of sulfanilamide, but I am sure that we are going to see them and it may be that this is one. I note that, when patients get too large doses of sulfanilamide for a long time, their breath begins to have a sweetish, musty odor. This to me indicates liver failure and it is always a warning to stop sulfanilamide at once.

The question whether this anemia might be due to the sepsis alone is impossible to determine.

## PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The autopsy on this man showed as the primary disease a very extensive cirrhosis of the liver. It was atrophic, with nodules of regeneration of considerable size. It was not very clear to us at autopsy why one portion had been so readily palpable. There was no point of particular prominence.

The liver microscopically showed minimal traces of iron but certainly not enough to justify a diagnosis of hemochromatosis. A slight increase in intrahepatic iron is a common thing in cirrhosis of the liver. Chemically it can usually be made out, and histologically it is often seen in cases which are not primary hemochromatosis. In a few places we could find quite typical hyalin of the alcoholic type, although that is an unusual finding in an Italian. The spleen weighed only 150 gm so it could not have been felt. There were no varices. The pulmonary lesion I cannot name any better than the clinician could. There was an extensive pulmonary fibrosis with some dilatation of the bronchioles and a great deal of intimal thickening in many of the pulmonary arteries. At this late stage of the game it would be difficult to say whether the arterial change was primary or secondary. My guess is that it was secondary, and I should assume that at some time in the past this man had had an extensive focal pneumonitis followed by organization rather than resolution and that all the changes were secondary to that. We could find nowhere anything that suggested pulmonary tuberculosis. What the etiology was, I have no idea.

The upper abdominal pain may of course have been due to the cirrhosis of the liver, as Dr Talbott suggested. However, he had an active gastric ulcer and the scar of a healed duodenal ulcer as other possible factors.

DR WHITE Was the right ventricle enlarged?

DR MALLORY No. The heart weighed only 250 gm.

DR TALBOTT Was there anything in the kidneys to explain the hematuria?

DR MALLORY Nothing of significance — only slight vascular changes.

DR HOLMES What was in the lungs to explain the marked change during the period of observation?

DR MALLORY Terminal edema and bronchopneumonia.

## CASE 25222

## PRESENTATION OF CASE

A forty-two-year-old housewife was first seen six days before admission to an outside hospital complaining of chills, fever and sore throat of three days' duration.

She had had two chills in the evening lasting from five to ten minutes and her temperature on one occasion was 101°F. She had vomited once. Examination showed a large, swollen, tender area in the left submaxillary region. The left tonsil was swollen and very red. She could not open her mouth more than half way. The temperature was 103.2°F. During the first thirty-six hours she was given 240 grains of sulfanilamide and 60 grains more during the next twelve hours. On the second day after this therapy was begun her temperature was 101°F and the swelling in the throat had slightly decreased. On the third day her white-blood-cell count was 3400 and the sulfanilamide therapy was promptly stopped. The next day she was prostrated, confused and very cyanotic. The neck was still very tender, but the swelling in the throat had greatly receded. The temperature was 98°F, the white-blood-cell count 30,000. On the following day there was much less prostration and she was no longer confused. The white-blood-cell count was 17,800, temperature 98.6°F. The neck and throat were practically normal. On the sixth day she had a chill lasting a half hour. Soon afterward her temperature was 105°F, pulse 140, respirations 24. She was then admitted to the outside hospital.

Physical examination showed a well-developed and nourished woman whose throat was slightly red, but otherwise normal. Examination of the eyes was negative. There was no glandular enlargement. The chest examination was negative except for a to-and-fro scratching sound over the pulmonic valve area which was thought to be due to her very rapid and forceful heart action. The abdomen was slightly distended but otherwise negative. Neurological examination was negative.

She was given 100 grains of sulfanilamide with out obvious effect. A lumbar puncture showed normal dynamics and a clear colorless fluid. Her nonprotein nitrogen was normal. Large doses of sulfanilamide were decided on. On the second hospital day the blood sulfanilamide level was 117 mg per 100 cc. The blood showed a white-cell count of 34,000. She had a well marked anemia. During the night she had another chill lasting a half hour followed by a temperature of 104°F. A transfusion was given in the afternoon. On the fourth hospital day she had a second transfusion during which she had a severe chill, the

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perimental results seem clear cut and seem to check very closely with the formation of the hemoglobin casts, so that at the present time it seems reasonable to me to accept the theory

In addition to the kidney findings there was a septic tonsillitis. There had evidently been some degree of thrombophlebitis in the peritonsillar veins because the lungs showed multiple septic emboli and the beginning of abscesses. There was no endocarditis and there was neither pleuritis nor pericarditis to explain the rub.

DR. CHAMBERLAIN. The course of this disease strikes me as being more like that caused by the staphylococcus than the streptococcus. Were there any cultures?

DR. HUGH A. STOUT. The postmortem blood culture was sterile.

DR. MALLORY. The liver showed jaundice. It was swollen and there were a few more leukocytes in the sinusoids than normal, certainly no extensive destruction of liver cells. I think one can say that there is a minimal hepatitis, whether it was due to the transfusion reaction, to the sepsis or to sulfanilamide, I certainly cannot say. There was no extensive hepatitis, however.

DR. RICHARDSON. One is at a loss to explain the jaundice. If this were *Staphylococcus aureus* septicemia there might be a hemolytic anemia, increasing the jaundice that you get from sulfanilamide.

DR. BERNARD M. JACOBSON. I should like to ask if sulfanilamide renders typing of the blood at all difficult.

DR. F. T. HUNTER. It should not interfere if the typing is properly carried out.

DR. BREED. I should like to ask why it seems more like a staphylococcal than a streptococcal process.

DR. LYONS. There are several things that made me think of that. First, she had an abrupt onset of chills with a fever that did not respond to sulfanilamide therapy. The white count went to 3400 on administration of sulfanilamide, but it did not similarly drop on the second administration of comparable doses. I think leukopenia is more apt to be associated with staphylococcal infection because of the leukocidin toxemia. The late recurrence of chills again is suggestive of a septic thrombophlebitis and the late thrombophlebitis with the manifestation of chills is much more apt to go with staphylococcal than streptococcal infection because of the nature of the inflammatory response that is elicited by staphylococcus. I think that the jaundice and the miliary lung abscesses which progressed after the acute infection subsided are more suggestive of staphylococcus than streptococcus when one considers the amount of sulfanilamide that was given.

A PHYSICIAN. Is sulfanilamide as apt to render the blood culture negative in staphylococcal infections as in streptococcal ones?

DR. MALLORY. I should think not.

DR. EDWARD A. GALL. What is the opinion regarding the height of jaundice following incompatible transfusion?

DR. HUNTER. That is hard to know because she had hemoglobin with much brownish color so that the icteric index is often read three times as high as it should be. A van den Bergh reading would be better.

It might be due either to sulfanilamide alone or to sepsis or most probably to both. In regard to one laboratory finding, the low chloride, the exact explanation is not clear, although it may have been the result of the previous high fever and sweating with considerable vomiting. I should think that was the most reasonable explanation.

She died, and why did she die? I think as you look over this story you find that things were progressing quite well when she had an episode of leukopenia which scared her physician. He stopped the sulfanilamide and the patient responded rapidly. She was still septic, however, as many of the patients with streptococcal disease have been this year. Then something happened. On the fourth hospital day she was given a transfusion during which she had a severe chill. She has had so many chills that we may have become more or less desensitized to them. She has a transfusion, a sudden chill, and oliguria. I believe this patient was given incompatible blood, and that she had agglutinins in the blood serum of low titer, so that immediate reaction was not apparent, but that she did have transfusion renal failure. If that is the case it might cause hemolysis of the donor's cells and increase the icterus to a slight extent but not to 50 or 60. I still do not think we have explained her severe jaundice. I think the severe jaundice is due to what Dr. Mallory will call a toxic hepatitis, which I believe is due to sulfanilamide, but it may not be possible to tell whether it is that or toxic hepatitis from infection. I should like to say one thing more. I may be wrong about the transfusion reaction. It is said to be due to plugging in the kidney tubules, due to precipitation of hemoglobin. That may be true and is a perfectly good theory. I would ask why the patients with paroxysmal hemoglobinuria have hemolysis of the blood, often massive, and still do not go into immediate renal failure. I do not see any difference, although there may be some explanation I do not know about. It is of course conceivable that there is some infectious process in the abdomen, an appendix with appendiceal abscess or phlebitis and multiple liver abscesses, jaundice and death. I mention them but I see no evidence for them, and I will not consider them further. I will say, then, that the patient had infection with beta-hemolytic streptococcus, arising in the throat, that she had an incompatible transfusion, with renal failure, and that she had a toxic hepatitis on the basis of prolonged administration of sulfanilamide.

DR. TRACY B. MALLORY: Are there any suggestions?

DR. WILLIAM B. BREED: Would you on examination be able to determine that a patient had died as a result of incompatible transfusion?

DR. MALLORY: I believe so.

DR. BREED: On what basis?

DR. MALLORY: I shall proceed to tell you because I think that was the case here.

#### CLINICAL DIAGNOSES

Acute yellow atrophy of liver  
Sulfanilamide poisoning?

#### DR. RICHARDSON'S DIAGNOSES

Beta-hemolytic-streptococcal infection (arising in throat)  
Incompatible transfusion, with renal failure.  
Toxic hepatitis

#### ANATOMICAL DIAGNOSES

Sepsis, type undetermined  
Septic infarction of the lung with abscess formation  
Hemoglobin nephrosis  
Toxic hepatitis, slight

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: As you have noted from the record this patient was never in the Massachusetts General Hospital, although she was seen by various members of our staff in consultation. At autopsy the kidneys were a little enlarged. They weighed 400 gm. whereas 300 gm. would have been a fair size for a woman of her build. The gross characteristics were not very striking. There were some reddish spots that looked hemorrhagic, but the cortex was only slightly swollen. On microscopic examination the outstanding feature was the plugging of most of the collecting tubules with orange masses of precipitated hemoglobin. It is, I think, difficult when looking at sections from a case of this sort to convince oneself that every tubule is plugged and that the renal insufficiency can be explained purely by intrarenal hydronephrosis as has been claimed.

There is a certain amount of experimental work\* which is interesting in this regard. It has proved possible in dogs to produce renal shutdown by hemolytic agents or the infusion of hemoglobin in solution, and it has been found that the development or the failure of development of renal insufficiency apparently depends on the reaction of the urine. If the urine is acid at the time that the hemoglobin passes through the glomerulus it is apparently precipitated in large amounts in the tubules. If the animal has previously been given alkalis in sufficient quantity to keep the urine alkaline no renal deficiency develops. The ex-

\*DeGowin, E. L., Warner, E. D., and Randall, W. L.: Renal insufficiency from blood transfusion. II. Anatomic changes in man compared with those in dogs with experimental hemoglobinuria. *Arch. Int. Med.* 61:609-630, 1938.

Channel for a protracted tour to Paris, Lyons, Montpellier and finally the Riviera, making his headquarters at Nice from November, 1763, to May, 1765. He shrewdly saw the great future of Nice and Cannes and envisaged the Cornice road, later designed by Napoleon. Although of choleric temperament and somewhat jaundiced in most of his views of what he saw abroad, he nevertheless had his letters published on returning to London in 1766. These *Travels through France and Italy* (London, 1766) give an accurate account of what he observed and served to stimulate interest in the Riviera as a pleasure and health resort.

There is little of medical interest in the two volumes, although some of the letters are to a doctor. In Montpellier he consulted a celebrated French professor of medicine by a letter written in Latin. The reply, in French, indicates that the learned gentleman could not read Latin or did not bother to read Smollett's notes. When sent back, with passages marked, the answer was equally irrelevant. Guessing the cause of Smollett's illness to be tuberculosis, he advised turtle-soup! Smollett was not well. His asthma and rheumatism prevented him from looking up some manuscripts for his friend, John Hunter. In Nice he kept a detailed register of the weather from November, 1763, to March, 1765, which is appended to his *Travels*.

Smollett's whole life, however, is of more than usual interest to physicians. After an apprenticeship of five years with a doctor, Smollett became a fleet surgeon and later lived in Jamaica, where he married his Creole wife, who was so devoted to him in his latter years. Returning to London, he was closely associated with Hunter, Pitcairne and Smellie, while practicing surgery. He was soon drawn to coffee-house society, became noted as a raconteur and, in spite of a move from Westminster to Mayfair to gain practice, the world of letters was more to his liking. *Roderick Random* came early, published when he was only twenty-seven, *Peregrine Pickle* and *Count Fathom*, a few years later. *Humphrey Clinker*, his masterpiece, was written in 1770, in Italy. His life was drawing to a close and he wrote John Hunter in 1771

"If I can prevail upon my wife to execute my last will, you shall receive my poor carcass in a box after I am dead to be placed among your rarities. I am already so dry and emaciated that I may pass for an Egyptian mummy without any other preparation than some pitch and painted linen."<sup>2</sup> Dying in Italy, however, he was buried two days later in Leghorn, his wife, apparently, thought that best.

## REFERENCES

1. Seccombe, T. Tobias George Smollett (1721-1771). *The Dictionary of National Biography*, Vol. 18. New York: The Macmillan Co. 1909. P. 586.
2. *Ibid*. P. 588.

## MASSACHUSETTS MEDICAL SOCIETY

## ANNUAL MEETING NEWS

## MOVING PICTURES

The value of moving pictures in the demonstration of medical topics is well recognized. This year the Committee of Arrangements has procured a large number of films illustrating a variety of conditions, and has arranged to present these as a continuous program from 10 a. m. to 5 p. m. on Tuesday and Wednesday, June 6 and 7. These pictures will be shown in the Musicians' Room, which is on the main floor of the Municipal Auditorium. The program will be run on a published schedule and consists chiefly of fifteen-minute films. This arrangement will make it possible for members to select the topics of individual interest at convenient hours. Mr. Warren Sturgis, who is specializing in the production of medical moving pictures, will be in direct charge of the program. On Thursday morning, an opportunity will be given for repeating those films in which the greatest interest has been shown during the two preceding days.

## GOLF TOURNAMENT

The Golf Tournament, which has become so much a part of the June meetings of the Society will be held at the beautiful Wachusett Golf Club in West Boylston, a four-mile drive from the Auditorium. An innovation will be made this year in that play will be possible on two afternoons instead of one as has formerly been the case. This change has been made so that golfers can arrange their program and not miss meetings in which they are particularly interested. The starting play on the afternoons of Tuesday and Wednesday, June 6 and 7, will be from 1.30 to 3.00 o'clock, and the greens fees will be \$1.00 on Tuesday and \$1.50 on Wednesday.

The principal prize this year, as last, will be

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## THE SCIENTIFIC AND COMMERCIAL EXHIBITS AT THE ANNUAL MEETING

THE forthcoming meeting of the Massachusetts Medical Society is featuring twenty-one scientific exhibits. The Massachusetts Department of Public Health will demonstrate not only several different types of work directed from the State House but also that carried on at the Rutland State Sanatorium and the Pondville Hospital. Certain important activities of the American Medical Association, such as the dissemination of information concerning syphilis, the work of the Council on Foods, the Council on Physical Therapy and the Council on Pharmacy and Chemistry, will be shown in a series of booths.

In line with the policy of the Committee of Arrangements to stimulate interest among the local hospitals to exhibit certain of their activities and

interests, there will be four exhibits by members of the staffs of the Worcester hospitals. These include demonstrations of pathologic lesions in the genitourinary tract and of the treatment of certain types of fractures. An unusual exhibit on the production of milk with a high mineral content is to be put on by the medical milk commissions of Boston, Worcester and Springfield. This is the first time that a demonstration of this type has been shown in the Scientific Exhibits, and all physicians should become acquainted with the modern methods of improving the quality of one of our basic foods.

So much is offered in these scientific exhibits that is of interest and value to practicing physicians that none should fail to avail themselves of the opportunity to learn about some of the recent advances in medicine.

The number of commercial exhibits at this year's annual meeting is greater than ever before. Many old friends are back, and in addition, a number of well-known medical-supply houses are exhibiting for the first time. It is hoped that, old or new, they will be received with a keen show of interest. It should be realized that it is the amount of interest shown by physicians as evidenced by their visits to the various booths, that in the end determines the amount of exhibition space sold at these meetings, and hence their cost to the Society.

Many of these exhibits are extremely interesting and have been designed to show in an attractive form the new products as well as time tested ones. Much can be learned, if the physician is willing to spend a little time in examining them. Everyone is urged to register at all the commercial exhibits, and thus help to ensure prosperous meetings in the future.

## THE LITERARY PHYSICIAN

Few physicians have led a more harassed life than Tobias Smollett. Overwhelmed with his editorial duties with "his minions about him, to whom he prescribed tasks of translation, compilation or abridgement,"<sup>1</sup> three months in jail and the death of his daughter, Betty, in 1763, brought him to the breaking point. In June, 1763, he crossed the



# LEGISLATIVE NOTES

At a meeting of the Committee on State and National Legislation, on Wednesday, May 24, the Chairman was authorized to go before the Senate subcommittee considering the Wagner Bill. The final wording of his statement was arrived at only after consultation with Senators Lodge and Walsh and after a detailed discussion of it with Drs Edward H Cary, Walter F Donaldson, Roscoe L. Sensenick, Olin West, Morris Fishbein, William C Woodward, and William D Cutter of the American Medical Association who helped to bring it into its final form and unanimously approved it. Dr Cary, who presided over the Association opposition to the bill, introduced the writer to the subcommittee.

STATEMENT OF DR. CHARLES C LUND, OF BOSTON, MASSACHUSETTS, CHAIRMAN, COMMITTEE ON STATE AND NATIONAL LEGISLATION OF THE MASSACHUSETTS MEDICAL SOCIETY, TO THE SUBCOMMITTEE OF THE COMMITTEE ON EDUCATION AND LABOR OF THE UNITED STATES SENATE, CONSIDERING THE WAGNER BILL, SENATE 1620 MAY 26, 1939

The Council of the Massachusetts Medical Society, which is our legislative body, has not met to consider the Wagner Health Bill, Senate 1620. However, the Committee on State and National Legislation has given the bill very serious consideration and has authorized my appearance to discuss it.

At the present time the United States Government in one way or another is carrying on or aiding medical activities through a great multitude of bureaus and departments. These activities operate under a great mass of diverse laws and regulations and are not always well co-ordinated. President Roosevelt has, with the consent of Congress, just taken a step of fundamental importance that has met with widespread approbation even in New England. That step is the regrouping of several agencies of the government. Is it too much to expect that the majority of the present federal medical activities (except the Army and Navy services), and all future ones, if new ones are created, shall be placed together? We realize that there were probably sound reasons to explain how the present complex situation arose. But is such a situation still sound? The greatest defect in the bill is that it not only perpetuates overlapping of medical activities in separate departments but even adds to overlapping by giving the Social Security Board new and widespread medical functions.

How cumbersome this proposed situation is may be seen by the authorization in the bill of 245 and more state and federal advisory councils (not counting those for the District of Columbia, and so forth). Now the advisory council idea is, per se, excellent. But there should be one federal council and one council for each state and territory, —not five for each. Also, these councils should be created at once and given the broadest possible advisory powers, so that they would have under their consideration any medical problems arising in connection with any governmental activity. The councils should be so constituted that the medical profession and the public are both adequately represented. Our state health department is well run by such a council.

The provision in the bill that gives the Federal Government the power to refuse grants to states that do not have a merit system of appointment and promotion in the departments spending the grants is, in our mind, very good and one of the most important provisions of the bill. Of course, we don't want any more interference in our local

affairs than is necessary. But we feel that we have a right to be assured that any federal funds spent on the care of the needy will not pass through the hands of inefficient political appointees.

In this connection, we have another suggestion. One item in the cost of illness is the cost of medical care of totally needless illness. We in Massachusetts naturally object to paying for the care of such patients either in our own or any other state. It would not require any federal funds for every state to abolish smallpox. The methods of doing this have been available for years. The cost is low and well within the possibilities of budgeting by the poorest states. Nevertheless, why was the average incidence of smallpox in this country 7600 cases per year from 1933 to 1937, inclusive? Purely because the responsible officials and the public have either failed to see that the proper control laws have been passed by their legislatures or they have not enforced their laws. We suspect that either the educational, political, or public health organization in these states is of such a nature that subsidized medical care might not be appreciated or efficiently utilized.

TABLE 1 Cases of Smallpox During the Five Year Period (1933-1937 Inclusive) and Annual Rate per 100,000 Population by Type of Vaccination Laws

STATES WITH COMPEL SORY VACCINATION		STATES WITH LOCAL OPTION		STATES WITHOUT COMPELSON	
	CASES RATE		CASES RATE		CASES RATE
Massachusetts	0 0	Maine	0 0	Delaware	1 0.03
Pennsylvania	0 0	New Jersey	0 0	Vermont	3 0.16
Rhode Island	0 0	Florida	25 0.3	Michigan	298 1.26
Maryland	1 0.02	Connecticut	29 0.35	Arizona	40 1.96
New Hampshire	2 0.08	No Carolina	109 0.64	Oklahoma	512 4.08
Dist. of Columbia	4 0.14	Georgia	119 0.78	Illinois	1773 4.54
New York	189 0.30	Tennessee	168 1.18	Nevada	29 5.86
Virginia	61 0.46	Ohio	467 1.40	Indiana	1022 5.96
So. Carolina	84 0.92	Alabama	211 1.48	California	2402 8.02
Kentucky	154 1.08	Mississippi	166 1.66	Utah	260 10.10
West Virginia	110 1.22	Louisiana	212 2.00	Minnesota	1729 13.14
Arkansas	482 4.82	Texas	2515 8.28	Missouri	2585 13.22
New Mexico	103 4.88	Colorado	973 18.28	Wisconsin	2828 19.42
		Oregon	1466 29.08	Kansas	2126 22.64
				Iowa	3162 24.96
				No Dakota	1096 31.32
				Washington	3029 37.10
				Nebraska	2583 37.88
				So. Dakota	1515 43.78
				Idaho	1076 44.92
				Wyoming	796 68.62
				Montana	2467 92.92
Totals	1190 —		6460 —		31332 —
Cases per year	238 0.57		1292 3.43		6266 14.1

Now we want to discuss a purely financial question that we know is uppermost in the minds of many doctors who criticize this bill vociferously. That is, where is the money coming from to pay the bills? Only a few doctors start to practice medicine with any capital except what they have invested in their education. They expect to save money and invest it for their old age, if they can. The immediate effect of this bill would probably be to increase the incomes of some doctors. That, of course would be of immediate benefit for them. But doctors are trained to look beyond immediate results in all their work. Here they look at a government that has been going into the red for many years. They realize that much of the increase in debt was not to be avoided. In so far as the enactment of this bill may increase the expense of government, it will further the tendency to inflation that many people think is steadily in progress. The doctors wonder, and in this they are like millions of other Americans, what their savings will be worth some years from now. The doctors

the honor of having one's name inscribed on the Burrage Bowl, presented last year by Dr Walter S Burrage in memory of his father the late Dr Walter L Burrage, who was secretary of the Society for so many years. Custody of the bowl, which is awarded for the low net score, was won last year by Dr Roy E Mabrey. The local committee in charge of the tournament is offering prizes for the three low net scores and the three low gross scores and three for the winners in the kicker's tournament. Club or state handicaps will be necessary in playing for the net or gross prizes.

The prize winners this year will have the distinction of receiving their prizes at the annual dinner where the presentations will be made by the president, Dr Channing Frothingham. A luncheon will be served to any members who wish to eat at the club before starting play. Reservations can be made by telephoning the club at West Boylston 110.

At the registration desk in the Auditorium there will be handbills giving directions to reach the club and any other necessary information.

## SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

### BLEEDING IN THE PUERPERIUM

Mrs M G M, a thirty-year-old gravida II, was discharged from the hospital on the eighteenth day following a normal delivery and convalescence. On January 13, 1936, two days after she arrived home, she reported by telephone that she was flowing very freely.

The family history was non-contributory. The patient had had scarlet fever and measles in her childhood. She had had a routine tonsillectomy but no other operations. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted seven days, with no discomfort. Her last period was March 13, 1935, making the estimated date of delivery December 18. Her first pregnancy had been terminated by a simple forceps delivery after a labor of not over six hours.

As she lived 20 miles in the country, a physician in a nearby town was asked to see her following the telephone call. Three quarters of an hour later the bleeding recurred, and it was advised that she be brought into the hospital. There was a great delay in getting an ambulance, and the patient did not arrive at the hospital until three hours after she had first been seen. On entry she was pulseless, no blood pressure could be obtained,

and she was still flowing, but not excessively. One quarter grain of morphine was given immediately, and under nitrous oxide and oxygen anesthesia a vaginal examination was performed. A large piece of retained placenta was found in the cervical canal. This was removed by the fingers, and an iodine strip was left in the uterus. Intravenous glucose solution was given at the start of the operation. Half an hour later the blood pressure was 60 systolic, 40 diastolic, and after another half hour 90 systolic, 60 diastolic. The pulse at the latter time was definitely palpable, with a rate of 110. It was believed that, although the need of transfusion was not urgent, convalescence would be improved if it were done. In consequence, a citrate transfusion of 750 cc was given, the husband of the patient being used as the donor. The pack was removed from the uterus the day following operation, and there was no subsequent bleeding. For several days her temperature ranged from 100 to 101°F in the afternoon. She was discharged from the hospital two weeks after entrance.

The following is a report of her blood examinations: January 14, hemoglobin 50 per cent, red-blood-cell count 2,270,000; January 18, hemoglobin 60 per cent, red-blood-cell count 2,820,000; January 21, hemoglobin 70 per cent, red-blood-cell count 3,070,000; January 27, the day of discharge, hemoglobin 75 per cent, red blood-cell count 3,820,000.

*Comment.* The retention of a piece of placenta is the commonest cause of serious bleeding in the puerperium. In this particular case the placenta was looked at carefully when the baby was born, and although it was a little irregular, it was not evident that a piece remained in the uterus. Even if it had been thought that a piece of it had been left, conservatism would have been the ideal treatment in the absence of any undue bleeding during the entire stay in the hospital.

This hemorrhage came on very suddenly and without warning, and the patient must have flowed tremendously. It was unfortunate that the delay occurred in getting her into the hospital. When she arrived, she was in very poor condition. Transfusion was not done immediately because there was still some bleeding and it seemed very important that this be stopped.

It cannot be advised too strongly that all cases of bleeding should be checked by blood examination, only in this way can the total amount of blood loss be accurately determined—observation gives only an estimate at best. Furthermore, the therapeutic value of transfusion cannot be over-emphasized.

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

and by radio, the medical aspects of cancer have been frequently presented. Positive results of this campaign have been noted in the steadily increasing number of individuals who have visited the tumor clinics for advice and treatment. No new tumor clinics have been added during the past year. The list is as follows:

Central Maine General Hospital, Lewiston, Eastern Maine General Hospital, Bangor, Maine General Hospital, Portland, Sisters Hospital, Waterville, St. Mary's General Hospital, Lewiston, Thayer Hospital, Waterville.

Members of the Cancer Committee have served as clinic personnel, along with other members of the institutional staffs.

Figures from the office of the Women's Field Army show that the Joseph W. Scannell Memorial Fund was exhausted October, 1938, so great was the increase in demand for services to the indigent. Benefits from this fund were widely distributed throughout the State.

The question has been brought up of placing other diagnostic clinics at strategic points in the State in areas not now easily covered. These would serve to lighten the load on some of the large centers. A study of this problem is now going on, and key men are being contacted with the idea of inaugurating such diagnostic centers. Because of the requirements of high voltage roentgen therapy and radium, only the large clinics are likely to carry on the therapeutic measures of radiation.

Early in the year a symposium on cancer was prepared by a committee member, Dr. Edward H. Risley, of Waterville, acting also in his capacity as chairman of the Advisory Board of the Women's Field Army. Contributions to this symposium were made by members of the Cancer Committee and other medical members of the Advisory Board. Under appointment, requested by the Committee on Graduate Education, Dr. Risley plans to offer this symposium for panel presentation at a meeting of the county medical societies.

In review it may be stated that cancer work in the State is much more active than it has been for years. The educational activities of the Women's Field Army for the Control of Cancer, backed by the personal and professional co-operation of the members of the Maine Medical Association, are helping the laity, as a whole, to become more and more cancer-conscious. The biggest problem now seems to be to synchronize the educational work with funds available for carrying the increasing load of indigent patients who seek treatment for cancer.

FORREST AXES, *Chairman*

#### REPORT OF COMMITTEE ON GRADUATE EDUCATION

One of the most important responsibilities facing state medical associations is that of providing an adequate program of graduate education. The problem varies in different states, due to many local factors. Consequently there are bound to be many variations among the several programs which are being developed. A permanent organization of the different state committees on graduate education has been effected, for mutual benefit and exchange of ideas. Your chairman has attended each meeting of this central organization and plans to be present at the next meeting in St. Louis at the time of the meeting of the American Medical Association.

Your committee has had several meetings during the year and has been in conference with the Council and the county secretaries.

Because of the unique advantage accruing to the State through the Bingham and the Commonwealth fellowships, our program naturally becomes divided into two parts: the first is intramural and is concerned with making available adequate educational programs within the State,

and the other has to do with the wider utilization of courses available in Boston.

It was decided to develop our intramural program in conjunction with the county societies. After some experimentation, in an endeavor to find the most interesting type of program, a series of panel discussions were prepared and offered to the county societies. Panels on the following subjects are now available: Pneumonia, Cardiovascular Disease, Fractures, Acute Appendicitis and Complications, Laboratory Methods and Their Application in Clinical Medicine, Surgery of the Thorax and Cancer. It is expected that panels concerning other subjects will be developed from time to time, depending on the demand. So far this type of program has seemed very popular and worthwhile.

Your committee has co-operated with the directors of both the Bingham and the Commonwealth funds in an endeavor to have the available fellowships allocated where they are most needed. For the most part these fellowships have been intended for men practicing in the small communities. As nearly as can be estimated about 15 per cent of our members have taken advantage of these fellowships. Perhaps another 10 per cent have been providing their own educational programs through long-established hospital or society affiliations—and need not enter the picture. Of the remaining 75 per cent, eliminating the men near retirement age, there must be about 50 per cent who should have facilities for some form of graduate study. An intramural program is essential in order to reach them. In turn, this may stimulate interest in some phase of our extramural program. At present it does not seem necessary to expand our program but rather to co-ordinate and develop what we already have. The sole exception to this might be where, in certain counties, such as Aroostook, the geographical problem makes it difficult to attend meetings, especially during the winter. Here it might be well to consider the question of intensive intramural courses—to be given during the summer. If there be sufficient local interest, such a program can be developed and financed without expense to the local groups. It is understood that the Bingham Associates are developing another form of fellowship, giving short intensive courses of one week's duration. These will provide study on more specialized subjects than heretofore available and should appeal to a greater number of our members.

The following recommendations are made:

- (1) Greater co-ordination between the programs of the annual meeting and the Fall clinical session and the program of graduate education. While there is no desire to interfere with the committees in charge of these two annual events, the Committee on Graduate Education necessarily must have a long range viewpoint, and co-operation between these committees might result advantageously for all concerned.
- (2) Continuation of the panel-discussion type of program—through the county societies.
- (3) Further development of the hospital staff program, utilizing the available material for case study.
- (4) Participation of the association as an organization in the New England Postgraduate Assembly. This has already proved its usefulness. It offers a great deal in the way of postgraduate education.
- (5) Co-operation with the Bingham and the Commonwealth funds in the extramural programs—through greater utilization of the available fellowships. Through application to the committee, courses on any desired subjects may be obtained for groups of four men.

F. T. HILL, *Chairman*

would look with more favor on a bill that went much more slowly and which did not contain in any place the rather frightening phrase 'such sums as may be needed to carry out the purposes of this title, coming as it does repeatedly, after the mention of sums, which, while they may not be very large in the national economy, seem enormous to the individual citizen

There are wide discrepancies among various estimates that have been made as to the number of people who for financial reasons now do not obtain medical care. Everyone admits that the group that most needs to be provided with medical care is that group which has no appreciable income on which to exist. We suggest that before starting to furnish federal aid for the medical care of employed people, medical care to be furnished under the bill be limited to the indigent and the medically needy. If the lowest estimate of the numbers of medically needy and indigent persons is correct it will be a very small matter to rectify—but, if the highest estimate is correct, the problem is so enormous that it will take all the possible available resources in money and trained men, without at the same time taking on the other even greater problem of aiding in the care of those who are better off

I make a plea for co-operation between the doctors and the government. In Massachusetts a most remarkable thing has happened. The adjusted death rate for cancer in women has been decreasing for five years and the rate for men has become level. This is the only state in the Union where this has occurred, and it has not occurred in any foreign country. This has been accomplished by the simultaneous use of two means. First, the establishment of state-aided cancer clinics about twelve years ago helped a little. But during the first few years of operation of the clinics there was no decrease in the elapsed time from the onset of the cancer to first treatment of it which is the most important factor in controlling an individual case.

Secondly, for five years, the State Department of Health has been promoting the education of the public in an original manner. Women's clubs are stimulated to ask for lecturers on cancer. They are encouraged not to go outside their town in search of an expert, but to invite one of their general practitioners. If the doctor believes that he is not prepared to give such a talk, he is provided with suitable material prepared for him by the Massachusetts Medical Society and the State Department of Public Health. This serves two purposes. (1) it educates the public, and (2) it educates the doctor. The cases are now coming in months earlier and the results improving steadily.

#### SUMMARY

If federal legislation concerned with the public health is to be enacted, it should be directed toward the following objectives:

1. Unification of most of the present medical services of the federal government, except the Army and Navy services. All future federal medical activities should be added to this group.

2. Representative medical advisory councils to work with the federal and state medical officers.

3. Expansion of activities where clear evidence of need for expansion is proved.

4. Support of existing recognized hospitals, rather than building new governmental ones for the care of the indigent, thus reducing the number of vacant hospital beds instead of increasing it.

#### DEATHS

**HOLTON**—CHARLES E. HOLTON, M.D., of 391 High Street, Medford, died May 22. He was in his seventy-second year. Born in Lee he received his degree from the University of Vermont College of Medicine in 1892. For more than thirty years he was an investigator in the food and drug control division of the United States Department of Agriculture.

Dr. Holton was a former member of the Massachusetts Medical Society.

His widow and a daughter survive him.

**MAYO**—CHARLES H. MAYO, M.D., of Rochester, Minnesota, died May 26. He was in his seventy-fourth year.

Born in Rochester, Minnesota, he received his degree from Northwestern University Medical School in 1888. With the death of his father, he and his brother inherited a general practice and their father's interest in St. Mary's Hospital. The Mayo Clinic was formally organized in 1912, and in 1915 the Mayo brothers gave \$1,500,000 to establish the Mayo Foundation for Medical Education and Research in affiliation with the University of Minnesota. Dr. Mayo was a past president of the American Medical Association and the American College of Surgeons.

Among his affiliations were fellowships in the American Medical Association, American Surgical Association, Southern Surgical Association, Western Surgical Association, American College of Surgeons and the Society of Clinical Surgery. He was professor-emeritus of surgery at the University of Minnesota Medical School.

His widow, a son, Dr. Charles W. Mayo, four daughters, and a brother, Dr. William J. Mayo, survive him.

**SHINN**—PHILIP A. SHINN, M.D., of Rockland, died May 23. He was in his fifty-fifth year.

Born in Portland, Maine, he received his degree from Tufts College Medical School in 1915, and interned for two years at the Robert Breck Brigham Hospital, Boston. Dr. Shinn was a lieutenant in the naval medical corps during the World War and served more than a decade at the veterans' hospitals in Northampton, and Augusta, Maine. Eight years ago he joined the staff of the Boston Dispensary.

He was a member of the Massachusetts Medical Society, the American Medical Association, the American Psychiatric Association and the New England Society of Psychiatry.

A son and a daughter survive him.

#### MISCELLANY

##### MAINE NEWS

##### REPORT OF THE CANCER COMMITTEE

A review of the activities of the Cancer Committee reveals evidence of individual and collective co-operation rather than separate endeavor of the committee as a functioning unit. In other words, the work of the members of the committee has been so closely tied up with the public activities of the Women's Field Army for the Control of Cancer that there has been little room for other projects by the former. However, it would seem that this particular method of presenting constructive cancer work has not been without evidence of progress.

The educational campaign of the Women's Field Army has been eminently successful. To this campaign, various members of the Cancer Committee have contributed much in personal time and effort. Speaking before lay groups

tor will get in touch with the nearest policeman in any such cases, the officer will be only too pleased to assist the members of the Massachusetts Medical Society in every way possible.

CHANNING FROTHINGHAM, M.D.,  
President, Massachusetts Medical Society

## REPORTS OF MEETINGS

### HARVARD MEDICAL SOCIETY

At a meeting of the Harvard Medical Society at the Peter Bent Brigham Hospital on Tuesday, February 14, Dr Elliott C. Cutler presided. Four cases from the medical wards were presented.

The first case, presented by Dr Albert C England, Jr, was a fifty-six-year-old carpenter who came in with a chief complaint of pain in the left chest of four hours duration. When first seen in 1936 for excision of a lipoma of his left thigh, the patient gave a history of some dyspnea and swelling of the ankles. At that time his heart was moderately enlarged and there was a soft systolic murmur over the pulmonic area. Afterward the patient had had attacks of pain in his chest on exertion or emotion, a gnawing constricting substernal pain with radiation. Nitroglycerin gave moderate relief at first. The present entry four weeks previously was preceded by a sudden attack of more severe pain than usual. Physical examination showed nothing new. There were moderate arteriosclerosis, some pulmonary emphysema and slight clinical edema. The blood pressure was 220 systolic, 110 diastolic, an electrocardiogram showed abnormal T waves in all leads. In the hospital he was comfortable in bed with only slight pain.

Dr Robert Monroe in discussing this case mentioned the fact that nitroglycerin was losing its effectiveness. The patient had been much worried, and therefore, sedation had been necessary. The diagnosis was angina pectoris.

Dr Daniel Balad presented the second case, a fifty-five-year-old woman, who entered the second time with the same complaint she had had in October, 1937: mild palpitation, for six years, and dyspnea, for two years. At the time of the first admission, she had had a red-cell count of 1,600,000, a hemoglobin of 15 per cent, a hematocrit of 44, and a red-cell volume of 62 by  $10^{-11}$  cc. Following liver and iron therapy her red-cell count went up to 4,000,000 with 75 per cent hemoglobin. A story of black stools was unconfirmed, a gastrointestinal x-ray series was negative. The patient was discharged on iron therapy. At the present admission she had a red-cell count of 2,600,000 with 26 per cent hemoglobin. She had a 3+ guaiac test on her stools. A hidden malignancy was suspected, but repeat gastrointestinal series and proctoscopy showed no abnormalities. On treatment with iron and ammonium citrate the patient's hemoglobin had gone up.

Because of the microcytosis, Dr Marshall Fulton made a diagnosis of idiopathic hypochromic anemia. He doubted that the gastrointestinal bleeding was the cause. He said that in younger patients the picture would be consistent with chlorosis. Dr Monroe mentioned the relation of chronic blood loss to the premenopausal, postpregnancy period of life, and added that such patients need iron continuously for some reason.

The third case was presented by Dr C F Goeringer. A sixteen-year-old girl, born in Turkey, had come in the day before with the history of a swelling in her neck of two months duration, fatigue, dyspnea on exertion, flushing easily, nervousness and excitability, and a loss of 10 pounds during the past six months. The family history revealed one case of goiter. Physical examination

showed a normal temperature and blood pressure and negative heart and lungs. There was a suggestion of lid lag and tremor of the hands and tongue. There was a symmetrical, smooth, non tender, moderately enlarged thyroid gland, and a suggestion of a bruit. The basal metabolic rate was +25 per cent. Starting two weeks previously the patient had had Lugol's solution twice a day until a few days before entry, with some betterment in symptomatology.

Dr Cutler commented on the patient's pulse rate of 120, the moderate dermatographia and moist, warm hands, and said that he was more in favor of a diagnosis of effort syndrome than one of true Graves's disease.

Dr Goeringer also presented the fourth case, a fifty-five-year-old woman who was admitted for treatment of a carbuncle of the neck, but whose important though not troublesome symptoms were a brassy unproductive cough of ten years' duration, difficulty in swallowing and occasional substernal pain of three years duration, and in definite dyspnea on exertion without signs of decompensation. Two years previously she had begun treatment at the luetic clinic on the basis of a positive blood test and an x-ray examination which had revealed an aneurysm of the ascending aorta. Physical examination showed her pupils to be regular and equal, the trachea in the midline, a tracheal tug and pulsations in the second right interspace. There was no shock or thrill. Retromammary dullness was increased to 12 cm. There were some signs of compression of the lung under the right clavicle. The heart was slightly enlarged to the left, and there was a systolic murmur heard along the left sternal border and in the left axilla.

Dr Cutler commented on her lack of complaint. Treatment had been instituted for the sake of the occasional substernal pain. The diagnosis was aneurysm.

The remainder of the evening's program consisted of a talk by Dr Reginald Fitz, the title of his dissertation being *Forsan et Haec Olim Meminisse Juvabit?* which he ultimately translated as 'Every so often, for all of us, it is nice to remember things in the past.'

By the narration of a dream, Dr Fitz skillfully transferred himself and the audience back to February 14, 1898, in Baltimore at a clinic presided over by Dr William Osler. The first case was presented by a medical student, Mr Fulton, now Dr Frank Fulton. The patient complained of precordial pain. Dr Osler examined the patient himself and noted a sixty-six-year-old man resting comfortably in bed, without dyspnea. He had a slow steady pulse, and beading of the peripheral arteries. The heart was normal except for a slightly accentuated aortic second sound. Dr Osler then commented on the rareness of the syndrome of angina pectoris in the hospital wards of the time, and went into its history. Heberden in 1768 wrote the first account of angina pectoris, and his work still stands out, even at the present day. Matthew Arnold described his own case—a most valuable record by an intelligent man. He wrote of the pain on uphill walking or exercise. His pain became much worse when he made a visit to America, being without friends and under a strain. During a picnic in the Berkshires, his boat capsized, and the sudden attack of pain almost killed him. When Arnold returned to England and his friends, the pain almost disappeared, even to the point of allowing him to play tennis. Finally one sudden severe attack was followed three days later by his death. Allan Burn, in 1809, propounded the theory that angina pectoris was probably due to coronary disease, and he called it intermittent claudication.

The second case was that of a nineteen-year-old girl who had become quite familiar to the clinic by repeated

## REPORT OF THE ADVISORY COMMITTEE ON SYPHILIS CONTROL

The committee presents the following reports received from Dr. Roscoe L. Mitchell, assistant director of the State of Maine Department of Health and Welfare

During the year the director of the division gave thirty six lectures mostly to lay persons on the subject of venereal disease, the total attendance being about 3300 persons. About 800 pieces of educational literature were sent out in response to requests

The Diagnostic Laboratory performed 19,080 Kahn tests and 17,658 Hinton tests. Examinations for the presence of gonococci totaled 5827, 162 of these being performed at the branch laboratory in Caribou

No record is available of the number of syphilis treatments given by private physicians. The Bureau of Health receives reports from the twenty-seven state clinics, and their totals for the year 1938 were 11,846 doses of arsenicals and 12,948 doses of heavy metals

During 1938, 58 per cent of the newly reported syphilitic patients were attending the clinics, whereas 60 per cent of the new cases of gonorrhea were being treated by private physicians

Case reports give a total for 1938 of 588 cases of gonorrhea, 487 being acute, 90 chronic and 11 not stated. Five hundred and seventy two cases of syphilis were reported, the stages being as follows: 95 primary, 139 secondary, 289 tertiary, 36 congenital, 8 latent and 5 not stated

Free drugs of all sorts were issued by the bureau to 130 physicians, exclusive of the material furnished to the state clinics

## MAINE MEDICAL LEGISLATION IN 1939

*L.D. 873* Hospitals must admit osteopaths to practice in them and must do all laboratory work required by osteopaths. Not passed

*L.D. 22* Dr. Pratt's amendment to the Medical Examiners' Bill. Passed in the last week of the session after a very stormy career. Essential changes: number reduced to two each in the counties of Franklin, Hancock, Knox, Lincoln, Piscataquis, Somerset, Sagadahoc and Waldo, three each in Oxford and Washington, four each in Aroostook, Kennebec and York, five each in Androscoggin, six each in Cumberland and Penobscot. The Governor may appoint as many more as he considers advisable, not passed. The law will not take effect until January 1, 1941, that is, after the present Governor retires from office, consequently, the present Governor will not be embarrassed by failure to reappoint.

*L.D. 581* Sale of opium derivatives only on prescription. Passed

*L.D. 472* Sale of barbituric acid derivatives or compounds only on prescription, except for personal administration by a doctor, dentist or veterinary to his own patients. Passed.

*L.D. 820* Dispensation of marijuana forbidden. Not passed

*L.D. 874* Hospitals (and inferentially others) may charge only \$3.00 for x-ray pictures. Not passed

*L.D. 880* United States uniform narcotic law. Not passed

*L.D. 471* Requiring premarital examination for venereal diseases. Amended to require merely a prenatal examination. Requires every physician to take during gestation a blood sample and submit it to the State Laboratory. Passed in this amended form during the last week of the session. Recalled from the Governor's office and had the words added, "and no civil action shall be maintainable for failure to comply with this act." The

law says that the doctor must take the blood test of the patient. To be sure, the consent of the patient is required. But in making a malpractice claim the patient could, and from a previous experience in some instances would, claim that she gave the consent. That the doctor had not taken the test which the law demands could well be claimed to be malpractice. Consequently, this amendment was added to avoid malpractice suits.

*L.D. 606* Lien on casualty insurance proceeds for hospitals. Not passed.

*L.D. 57* Creating office of State Pathologist, earnestly supported by attorney general. Not passed.

*L.D. 537* Compensation Act. Employee may select his own physician in industrial injury. Not passed.

*L.D. 612* Non profit hospital corporations authorized. Not passed

*L.D. 938* Boards of registration, including that of medicine, may suspend the license fees if and whenever there is enough money on hand to warrant it. Not passed.

*L.D. 322* Incorporating the Associated Hospital Service of Maine (socialized hospital service). Passed

*L.D. 600* Optometrist Bill. Forbidding optometrists to practice when hired out, as to chain stores. Stormy career and in doubt up to the end of the Legislature. Passed, but probably ineffective for the purpose it seeks, because the chain stores employing the optometrist will have written contracts with them and probably can by injunction and in equity prevent the operation of the law to defeat their rights under the written contracts

*L.D. 755* To create a licensing department in the hands of one man to take over completely all the powers of the various boards of registration including medicine. Not passed.

*L.D. 811* Permits blood grouping tests in bastardy cases and makes the testimony of the examining physician admissible (heretofore such evidence unacceptable in Maine courts). Passed.

*L.D. 546* Commitment may be made of insane not only to state hospitals, as heretofore, but to government hospitals as well. Passed

*L.D. 1152* Lawsuits to recover for so-called "death without conscious suffering. Right to recover the reasonable expense of medical, surgical and hospital care and treatment" added. Passed. Heretofore in so-called "instant death" cases, that is, those in which the deceased never recovered consciousness after the injury, such incidental expense could not be recovered.

## CORRESPONDENCE

PARKING FOR DOCTORS  
IN A RESTRICTED AREA

*To the Editor* Having been called into court for visiting a patient east of Dartmouth Street before 10 00 a. m., I wrote as President of the Society to Superintendent of Police, Edward W. Fallon, asking if some provision could be made so that doctors visiting their patients in this area, where they are trying to stop early parking, could be worked out. I thought possibly you might like to make some comment in the *Journal*

After giving the matter consideration and consulting Deputy Superintendent John T. O'Dea, of the Traffic Division, he wrote me the following

It is not the aim of the Police Department to interfere in any way with a doctor making a legitimate call to answer any emergency where he is to wait upon the sick, the infirm or the injured and if any such doc

this retreat may be halted and the patient advanced to a better mental status

The "total push" method as used at the McLean Hospital, with the co-operation of Dr Tillotson and his staff, has been carried out for several months on chronic and what appeared to be hopelessly deteriorated schizophrenics. The results have been surprising in the amount of improvement which has been gained physically, socially and, in a narrower sense, mentally. No cure is claimed for this procedure, and in fact, no cure is anticipated. The method, however, shows that the deterioration is not a necessary part of the schizophrenia, and we are gaining insight into the nature of the disease process.

The paper was discussed by Drs Kenneth B Tillotson, Curtus T Prout, John W Thompson and Roy D Halloran.

## NOTICES

### REMOVALS

GUSTAVE B FRED, M.D., announces the removal of his office to 520 Beacon Street, Boston.

HOLLIS L. ALBRIGHT, M.D., announces the removal of his office to 412 Beacon Street, Boston Telephone KENmore 3750

### A WARNING

It has been reported to the *Journal* from a reliable source that a man claiming to be a medical student has entered a hospital and doctors' locker room without permission and stolen a valuable watch. This same man disappeared with money from a person who had befriended him. He goes under the name of Terry Roth or H. Barker, is 23 years old, 6 feet 1 inch, 185 pounds, has light hair, is of Jewish descent, and is hard of hearing in one ear.

Any information concerning this man would be appreciated by the chief inspector, Department of Police, Lynn, Massachusetts.

### TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10 00 to 12 30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium of high-voltage X-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

### SYMPOSIUM ON CARCINOMA OF THE TONGUE

A symposium on carcinoma of the tongue has been arranged by the staffs of the Massachusetts General, Collis P Huntington Memorial, Pondville and Palmer Memorial hospitals. A review of cases seen at each of these hospitals will be presented by Drs. Roy E Mabrey, Ira T Nathanson, Thomas J Anglem and Clifford C. Franseen. Discussion will be opened by Dr Channing C. Simmons.

The meeting will be held on Tuesday, June 13, on the roof of the Palmer Memorial Hospital, at 8 00 p. m. Refreshments will be served.

All members of the medical profession are cordially invited to attend.

LELAND S McHITTRICK, M.D., *Chairman*

## BIOLOGICAL PHOTOGRAPHIC ASSOCIATION

The ninth annual convention of the Biological Photographic Association will be held September 14 to 16 at the Mellon Institute for Industrial Research, Pittsburgh, Pennsylvania. The program will be of interest to scientific photographers, scientists who use photography as an aid in their work, teachers in the biological fields, technical experts and serious amateurs. It will include discussions of moving picture and still photography, photomicrography, color and monochrome films, processing, and so forth, all in the field of scientific illustrating.

This association is prepared to make photographs for physicians and others on a nonprofit basis. Further information about the association and the convention may be obtained by writing the Secretary of the Biological Photographic Association, University Office, Magee Hospital, Pittsburgh, Pennsylvania.

## INSTITUTE FOR THE CONSIDERATION OF THE BLOOD AND BLOOD-FORMING ORGANS

The University of Wisconsin Medical School is to conduct an Institute for the Consideration of the Blood and Blood Forming Organs, September 4 to 6. Formal papers are to be presented by a group of internationally known speakers.

Physicians and others who are interested are cordially invited to attend. A detailed program may be obtained by addressing Dr Ovid O Meyer, Chairman of Program Committee, University of Wisconsin Medical School, Madison, Wisconsin.

## MEDICAL LIBRARY ASSOCIATION

The forty first annual meeting of the Medical Library Association will be held from June 27 to June 29, at the Academy of Medicine of Northern New Jersey, 91 Lincoln Park, Newark, New Jersey. The program will include addresses, discussions, and demonstrations on library procedure, medical history and literature.

JANET DOE, *Secretary*

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 5

#### TUESDAY JUNE 6

\*10 a. m. 12.30 p. m. Tumor Clinic Boston Dispensary

#### WEDNESDAY JUNE 7

\*12 m. Clinicopathological conference. Children's Hospital amphitheater

#### FRIDAY JUNE 9

10 a. m. 12.30 p. m. Tumor Clinic. Boston Dispensary

#### SATURDAY JUNE 10

10 a. m. 12 m. Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

Open to the medical profession.

JUNE 1 and 2—Fourth Annual Convention of the National Gastroenterological Association. Page 557 issue of May 18

JUNE 5, 6, 7 and 8—American Association of Industrial Physicians and Surgeons. Page 551 issue of March 30

JUNE 6—Harvard Medical Alumni Association. Page 551 issue of May 18

JUNE 6—Tufts College Medical School Alumni. Page 551 issue of May 18

JUNE 6—Boston University School of Medicine Alumni Association. Page 551 issue of May 18

JUNE 6, 7 and 8—Massachusetts Medical Society. Worcester

JUNE 7—Massachusetts Medico-Legal Society. Page 551 issue of May 18

JUNE 12-17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 515 issue of May 11

visits. She had come in as white as a sheet, with a red-cell count of 2,000,000. She had chlorosis, a common disease of young working girls living under conditions of hard work, poor air, poor food and little exercise. Sir Andrew Clark was interested in this condition. During his time, methods of treatment were many and various. Given rest, food, fresh air and hygiene, all would get well. One favorite prescription was for tincture of cardamon, which contained the three essentials of good medicine—color, taste and harmlessness. Mr Pratt, now the revered Dr Joseph Pratt, presented some clinical charts on the patient. He showed how the red-cell count had improved with hygienic measures but added that the hemoglobin had not improved until she was given iron in the form of Bland's pills. Dr Osler's comment was that iron is a specific for chlorosis, no matter in what form it be given, so long as it is in large doses. Bland was a local physician, in a town in France, who made a careful series of observations on his patients with chlorosis and then presented his results to the Academy, thus gaining lasting fame.

The third case presented to Dr Osler was that of a young man of twenty-five with an exophthalmic goiter. He had pop-eyes, perspired easily, and was restless. He had a firm smooth symmetrically enlarged thyroid. He had all the other signs of hyperactive thyroid except a rapid pulse. Dr Osler considered the disease to be chronic, and occasionally acute, and said that some acute fulminations led to delirium and severe consequences. Basedow and Mobius and also Joffroy had written about it and noted certain signs that bore their names. Gräfe's sign pertains to lag of the upper lid, Stellwag described widening of the palpebral fissure. These men were all intensely interested in the causes of these phenomena rather than in the disease as a whole. They regarded it as the direct opposite of myxedema. Greenfield described the histopathology of exophthalmic goiter. The only treatment at that time consisted of well-meant measures such as an ice bag to the heart, and perhaps belladonna by mouth. Jones, in 1874, attempted to subdue the hyperactive thyroid by surgery. Dr Osler mentioned surgery as a recent innovation and very risky. William and Charles Mayo had recently reported 12 cases of which 8 had done well and 4 died. In the year 1863 Trousseau made his famous mistake, one of his patients required digitalis, since she had the heart condition associated with hyperthyroidism, but Trousseau, by mistake, prescribed tincture of iodine, ten drops a day, and found to his amazement that the drug led to clinical improvement. With his eyes open, Trousseau tested again, alternating digitalis and iodine and proved his point. Dr Osler spoke of this as probably indicating a better prognosis for such cases in the future.

The last patient was an obviously sick young Negro. The patient had barely managed to walk into the outpatient department, and his history had been taken by young Mr Henry Christian, who presented him to Dr Osler. The thirty-six-year-old patient had given a history of a primary chancre ten years previously, but he had been well until two months before entry when he began having dyspnea, an upper respiratory infection and a 'misery' in his chest. The last few nights he had had to sleep in a chair. Dr Osler then demonstrated by physical examination the visible pulsation in the sternal region, with the trachea displaced to the left, carotid pulsations and cyanosis of the tongue, nailbeds and lips. The patient's breathing was notable in that expiration was longer, louder, and more jerky than inspiration, respiration being mostly abdominal and stridulous. There was a diffuse area of sternal pulsation on the right, and a displaced

thyroid gland with pulsation above the right clavicle. Heart itself was normal. Examination of the lungs showed loud tracheal rales scattered throughout the chest. The patient had a hoarse voice, brassy cough and dyspnea. The diagnosis was obviously aneurysm, probably of the innominate artery. The surgical treatment consisted of ligation of the innominate artery, or perhaps osteotomy of the clavicle and manubrium to relieve tracheal pressure.

At this point Dr Fitz awoke from his dream, and I had to follow up these patients. The first patient in 18 months had a sudden severe attack, called his family quietly a few days later. The last case, the patient with aneurysm, was later demonstrated by Dr Osler at postmortem, and the diagnosis of aneurysm of the innominate artery was confirmed. Dr Osler bewailed their lack of courage in not having operated and ligated the vessel.

Dr Fitz explained, in answer to questions, that he secured his data for 1898 from Dr Joseph Pratt's lecture notes as a medical student. Mr Pratt had taken Dr Osler's lectures almost verbatim.

## NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The New England Society of Physical Medicine met at the Ring Sanatorium and Hospital on March 15 following a dinner served to members and guests. The program was presented at Hambury Hall. Dr Abram Myerson, director of research, Boston State Hospital, presided. The meeting was on Combined Physiotherapeutics and Motivation in the Treatment of Chronic Schizophrenia.

Dr Myerson said that the general principles underlying the treatment of the chronic schizophrenic by what he called the 'total push' method are (1) That mind and body are one and that mental functions can be profoundly influenced by bodily states, and vice versa, and that division of the individual into mind and body is only a convenience and not a scientific reality. The skin of the body, naturally a place of meeting of the organism with the stimuli which pour in on it, and the muscles, which express the activity of the organism and in particular convey and discharge emotional states, have especial importance in all physiotherapeutic, psychotherapeutic relations. (2) That men live in an atmosphere of praise, blame, reward and punishment, which are the most powerful social motives for conduct and for the inhibition of conduct that exist, aside from the natural hereditary constitutional drives. (3) That use and disuse of function plays an important role in the building up of personality and character, and where functions are non-used, this creates not only atrophy but a lop-sided development of personality and character.

The chronic schizophrenic is by virtue of his disease alone a person in retreat, and this retreat is associated with delusions, especially of reference, persecution and inferiority, with corresponding disorder of physical functioning. In the hospital to which he is sent, unless a continued effort is made regardless of his own co-operation, this retreat is enhanced, since he lives in what is designated as a physiological and motivational vacuum, by which his retreat is furthered and deterioration develops. It is the theory of this 'total push' method that the deterioration is an artificial product, that schizophrenia is not so profound a disorder as it seems, and that by using a available physiological and psychological measures in a organized, consecutive, day-by-day, and hour by hour method, with liberal administration of praise, blame, reward and, in so far as it is humanely possible, punishment



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## THE HEART IN ANEMIA\*

LAURENCE B ELLIS, M.D.,† AND JAMES M FAULKNER, M.D †

BOSTON

OXYGEN transport to the tissues is dependent both on the proper functioning of the cardiovascular apparatus and on an adequate level of hemoglobin in the circulating blood. The heart and the peripheral circulation act as the propulsive and distributive forces for this function and the hemoglobin as the vehicle. Hence any marked insufficiency in the hemoglobin throws a burden on the circulatory apparatus, and this additional strain may result in clinical symptoms and signs referable to the heart and peripheral blood vessels.

Clinical observations concerning the various effects of severe chronic anemia on the heart have been made and reported many times for at least a century. For the most part these observations have dealt with a few cases only and have been concerned with the findings made during the anemic phase and not when the blood level had been restored to normal. We have therefore made clinical observations on a series of 47 patients with severe chronic anemia (hemoglobin levels varying from 8 to 57 per cent) in 19 of whom the anemia was of the hyperchromic variety, and in 28 of whom it was hypochromic. Thirty-one of these cases have also been studied when the anemia had been partially or completely relieved. None of the patients had any definite evidence of heart disease except that many of them fell into the older age group and therefore inevitably had degenerative vascular disease to a greater or lesser degree. Observations were made of the size of the heart, the occurrence of murmurs, the arterial blood pressure and electrocardiographic changes, together with signs and symptoms referable to disturbance of circulatory function,

and these observations were correlated with the degree of the anemia.

### CARDIAC ENLARGEMENT

As long ago as 1857 Bamberger<sup>1</sup> mentioned that cardiac enlargement might be found in conjunction with anemic conditions. Subsequently numerous observers<sup>2-9</sup> have found enlargement in a varying percentage of cases of severe anemia. Gautier<sup>10</sup> in 1899 demonstrated such an increase in size by the percussion method in 20 of 22 patients, and showed that the heart became smaller when the anemia was relieved. Ball<sup>11</sup> was the first to show such an increase in heart size by x-ray measurements with reduction to a normal diameter after recovery from the anemic state. Others,<sup>12-14</sup> have since confirmed this finding and shown that this return to a normal size may occur within a very few weeks.

We have studied the cardiac size of 38 cases of chronic anemia by teleoroentgenographic measurements. Twenty of these patients had enlarged hearts. There was a tendency for enlargement to occur more frequently in patients with particularly low hemoglobin levels. There also appeared to be some correlation between the age of the patients and the frequency of enlargement. Of the 22 patients under fifty, with an average hemoglobin level of 36 per cent, 8 showed enlargement, whereas of the 16 patients fifty or over, with an average hemoglobin level of 39 per cent, 12 showed enlargement and 4 had none. There was no relation between the type of anemia and the occurrence of enlargement. Although it is probable that the duration of the anemia and the degree of physical activity in which the patient engaged, as well as dietary deficiencies other than that which produced the anemia, may have been of importance as predisposing to cardiac enlargement, our data did not permit us to evaluate such factors. None of the patients, however, had any other clinical evidence of vitamin deficiency.

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston.

In part the material for this paper was presented before the American Society for Clinical Investigation, Atlantic City, May 6, 1935, and in part before the combined clinical meeting of the Massachusetts Medical Society, Boston, June 1, 1938.

†Instructor in medicine, Harvard Medical School, junior visiting physician, Boston City Hospital.

- JUNE 13—Symposium on Carcinoma of the Tongue. Page 941  
 JUNE 26-29—National Tuberculosis Association Page 897 issue of May 25  
 JUNE 27-29—Medical Library Association Page 941  
 JUNE 29—Pentucket Association of Physicians 8 30 p m Hotel Whittier 5 Washington Street, Haverhill  
 AUGUST 30 SEPTEMBER 2—Seminar in Physical Therapy Page 857 issue of May 18  
 SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22  
 SEPTEMBER 4-6—Institute for the Consideration of the Blood and Blood Forming Organs Page 941  
 SEPTEMBER 5-8—American Congress of Physical Therapy Page 857 issue of May 18  
 SEPTEMBER 11-15—American Congress on Obstetrics and Gynecology Page 938 issue of December 8  
 SEPTEMBER 14-16—Biological Photographic Association Page 941  
 SEPTEMBER 15-28—Pan Pacific Surgical Association Page 863 issue of November 24  
 OCTOBER 23 NOVEMBER 3—New York Academy of Medicine Page 581 issue of March 30  
 FALL 1939—Temperature Symposium. Page 218 issue of February 2  
 MAY 14 1940—Pharmacopoeial Convention Page 894 issue of May 25

#### DISTRICT MEDICAL SOCIETY

#### NEW FOLK SOUTH

JUNE 14—Page 897 issue of May 25

### BOOK REVIEWS

*Emotions and Bodily Changes A survey of literature on psychosomatic interrelationships, 1910-1933* H. Flinders Dunbar Second edition. 601 pp New York Columbia University Press, 1938 \$5.00

The first edition of this book appeared in 1935. This edition has not materially changed the character of the book, but there is some additional material and particularly a long introduction by the author in which she advocates the development of centers for psychosomatic study, staffed by experimental physiologists and clinicians. The book is made up of a critical bibliography, extensive in character, and apparently covering practically all the literature in its 2300 references. There are critical digests of this literature, most of them comparatively short. These have been integrated into chapters covering subjects such as acute and chronic illness, metabolism, diseases of the various systems of the body, and therapeutic considerations. In general, this is a reference book of value to scholars working in this field. It is not a book that will be of much value to the general practitioner. With the knowledge that the author possesses, however, a series of essays on her chapter headings, based on the bibliography, would be of great value to the medical profession. As it is now, the material is so diffusely presented that no conclusions can be drawn in regard to the actual importance of the research that is being reported.

*Medical Information for Social Workers* Edited by William M. Champion. 529 pp Baltimore William Wood & Co, 1938 \$4.00

This book consists of a series of chapters written by nine physicians who have given courses of instruction at the School of Applied Social Diseases at Western Reserve University. It is designed to interest and instruct those who are engaged in the study of social work.

It is evidently the belief of these lecturers that all people engaged in this occupation should have a broad knowledge of medicine and disease in order to supplement the work of physicians in dealing with those patients who are found to have complications of a personal or environmental nature which may prevent a return to useful and enjoyable life.

Most of the important diseases are considered, but with

out any attempt to induce these social workers to take over the work of physicians, but rather to teach people the importance of relying on well qualified practitioners. Emphasis is given to the useful field open to these workers in dealing with the problems of community life and public health.

The book is well written and conveys a great deal of useful information which will interest young doctors. Indeed the busy practitioner could, in many cases, profit by perusal of it. Many of the chapters convey information which the laity may also read with profit—especially that telling how to select a physician. The reviewer found nothing to criticize in this book and felt repaid for the time devoted to it.

*Petite Chirurgie et Technique Médicale Courante* G. Roux. 591 pp Paris Masson et Cie, 1938 90 Fr fr

This book is intended as a text for senior students and as a practical reference volume for the general practitioner. It fulfills its purpose admirably, covering the fields of minor surgery, gynecology, urology and otolaryngology, as well as those procedures which in English speaking countries generally fall within the domain of 'medicine'. Typical Gallic orderliness and precision are reflected in the careful discussions of indications, contraindications and technique which accompany the presentation of each diagnostic or therapeutic procedure. No drug or medicine is mentioned without complete directions for its preparation, a practice which could well be adopted more often by American authors. There is a profusion of unusually fine and pertinent line drawings.

The book should enjoy a wide popularity in France and could be read with profit by the English-speaking student, intern or practitioner.

*Diagnostic Roentgenology* Renewal pages 1938 292 pp New York Thomas Nelson & Sons, 1938

Short additional contributions to original articles appearing in the first issue of *Diagnostic Roentgenology* have been made as follows.

- Diseases of Skull and Intracranial Contents Dr Cornelius G. Dyke.
- Paranasal Sinuses and Mastoids Dr G. W. Grier
- Radiology of the Chest Dr Coleman B. Rabin
- Cardiovascular System Dr Hugo Roesler
- Digestive Tract Dr Ross Golden.
- Diseases of the Bones Drs. Paul C. Hodges, D. B. Phemister and Alexander Brunschwig
- Diseases of the Urinary Tract Drs Leopold Jachs and Marcy L. Sussman.
- Uterotubography Drs Samuel A. Robins and Albert A. Shapira.
- Obstetrics Drs Howard C. Moloy and Paul C. Swenson

New chapters have been added as follows

- Dental Roentgenology Dr Leroy M. Ennis.
- Soft Tissues of the Air and Food Passages of the Neck Dr Barton R. Young
- The Abdomen Dr Ross Golden.

The entire subject matter is well handled, the book is profusely illustrated, and the contributions are up to date. This text should prove to be a valuable reference book not only for the physician specializing in x-ray but also for the general practitioner of medicine.

when Friedreich<sup>18</sup> first commented on the occurrence of such a murmur in a case in which autopsy subsequently proved that the valves were normal.<sup>13 22-25</sup> The usual diastolic murmur which is heard is early and blowing in character, and is best made out in the third left interspace near the sternal border. It is generally spoken of as aortic, and is thought to be due to functional aortic regurgitation secondary to cardiac dilatation. However, it may be that some at least of these murmurs are in reality due to a functional insufficiency of the pulmonary valve. Although Goldstein and Boas<sup>9</sup> report an incidence of 10 per cent of these murmurs in 39 cases of anemia, this is a very much higher incidence than that generally reported and than that which we have encountered. The murmurs occur only in association with very severe grades of anemia. The only patient in our series who exhibited a diastolic murmur of this type was a young woman of thirty-five suffering from pernicious anemia, with an initial hemoglobin level of 8 per cent and marked cardiac enlargement as judged by percussion measurements. With improvement in the anemia the murmur promptly disappeared and the heart size decreased. A check-up six years later showed the heart to be normal in every respect and the murmur to be still absent.

*Presystolic apical murmurs* in anemic patients have also been described,<sup>9 13 26 27</sup> and undoubtedly do occur. We ourselves have never encountered a true presystolic crescendo apical murmur in an anemic patient which was not clearly due to organic disease of the mitral valve. It is true that one not infrequently obtains a deceptive impression of a presystolic murmur due to a booming first sound or a presystolic gallop in anemic patients as well as in other persons whose hearts are overactive. This is seen especially in thin-chested individuals following exercise and in excited persons as well as in pregnancy and hyperthyroidism.

#### ARTERIAL BLOOD PRESSURE

Reports<sup>13 14 28 29</sup> concerning the effect of severe chronic anemia on the arterial blood pressure are in general in agreement that there is a tendency for a lowering of the systolic and diastolic pressures, and an increase in the pulse pressure in the milder cases while in the more severe the latter may be lowered. Of the 23 patients followed in our study 10 showed an increase in the systolic pressure of 10 mm of mercury or over and in 14 the diastolic pressure increased 10 mm or more following improvement of the anemia. Twice the systolic pressure decreased 10 or 15 mm, but in no case was there a significant drop in the diastolic. In 12 cases improvement was accom-

panied by a decrease in pulse pressure, in 8 no change occurred and in 3 there was an increase. A patient whose initial blood pressure was 125/60 had an increase to 190/115 as he improved, and in another case the pressure rose from 132/55 to 180/60.

The factors chiefly responsible for a diminution in blood pressure are a compensatory peripheral vasodilatation, decreased blood viscosity and a blood volume which, while usually within normal limits,<sup>30</sup> is in the lower range of normal and often less than the blood volume of the patient when his anemia has been relieved. The increased cardiac output occurring during the anemic phase tends, of course, to increase the systolic pressure, and therefore plays an important part in preventing the systolic pressure from falling even lower.

#### ELECTROCARDIOGRAPHIC CHANGES

Most of the published reports<sup>12 13 29 31-33</sup> concerning the effect of anemia on the electrocardiogram conclude that no striking electrocardiographic changes are to be noted. Tung et al<sup>13</sup> state that prolongation of the Q-T interval may occur, as well as other minor changes, and Elliot<sup>34</sup> found a flattening of T<sub>1</sub> in an anemic patient suffering from angina pectoris in whom autopsy showed the heart to be normal. Zimmermann<sup>35</sup> found that low amplitude and T-wave abnormalities were occasionally present in patients with severe anemia who had angina pectoris, but did not follow them after improvement in order to see whether the electrocardiographic changes had disappeared.

It has been observed<sup>1</sup> in dogs rendered acutely anemic by massive hemorrhage that at systolic-blood-pressure levels in the vicinity of 40 mm of mercury, changes in the electrocardiogram occur which suggest an inadequate coronary blood flow, and that these changes can be promptly eliminated by raising the blood pressure through the infusion of blood or saline solution. Although in several human cases of profound shock and acute hemorrhage, in 1 of which no blood pressure was obtainable, we found the electrocardiogram normal except for tachycardia, in a number of cases of severe chronic anemia we observed electrocardiographic changes which promptly disappeared with the return of the blood toward normal.

Electrocardiograms were taken in 45 of the 47 cases in the group, and in 10 abnormal records were found. The electrocardiograms were repeated in 29 cases. Of the 7 cases in this group which were abnormal at the outset, 5 returned to normal coincidentally with improvement in the blood picture. In one of the 5 the abnormality consisted of an A-V nodal rhythm, a finding which has

Measurements of the cardiac size both before and after successful treatment of the anemia were made in 26 cases. Eighteen of these showed a definite decrease in size of the heart shadow (varying from 10 to 47 cm in the transverse diameter), and in 8 there was no essential change. The greater the degree of the anemia the more likely was the heart to decrease in size following improvement, which is natural since such patients were more prone to have initially enlarged hearts. The changes observed took place within a period of three to twelve weeks in most cases, although in a few cases the second observation was not made until a longer time had elapsed. In 7 of the patients with initial enlargement the heart had decreased to normal size at the time of the second observation, and the hearts of 6, though smaller, were still above the upper limits of normal. Five patients whose hearts were normal in size at the outset showed a decrease after improvement. In none of the 8 patients whose hearts remained unchanged in size was there an initial enlargement.

A third check-up of the cardiac size months or years after the second examination was made in 8 cases. Of the 3 patients whose hemoglobin level remained unchanged, one showed a further decrease in heart size. Five showed continued improvement in their blood, and in 2 of these the hearts had grown still smaller.

An important factor in aiding the return of the heart size toward normal in our patients is the fact that for the most part during the period of treatment of the anemia they were either kept in bed or lived a bed-and-chair existence on the hospital wards, whereas prior to the discovery of their anemias most of them had been engaged in a much greater degree of activity and had thus subjected their hearts to much more strain.

It is evident from the comparatively rapid decrease in size of the heart that may occur that such enlargement must be due at least in part to dilatation. Cardiac hypertrophy, however, has also been shown to take place. Cabot and Richardson<sup>15</sup> found from autopsy study that there was increase in heart weight in 18 of 19 patients dying of pernicious anemia. In 1 case the heart weighed 710 gm. Porter<sup>12</sup> observed a heart weighing 630 gm in a man dying of hookworm anemia. Numerous experiments on animals bearing on this point have been made, the majority of which<sup>16, 17</sup> have given evidence of cardiac hypertrophy as the result of profound anemia. It is Porter's belief that anemia of short duration results in cardiac dilatation which can be completely overcome with relief of the anemia, but that in cases of long duration hypertrophy takes place and this can never be completely reduced. The

belief of some of the older clinicians<sup>3</sup> that anemia may lead to permanent organic valvular disease is not now accepted.

In addition to dilatation and hypertrophy, the anemic heart muscle undergoes a form of fatty degeneration which has long been familiar to pathologists.<sup>18, 19</sup> The characteristic yellow streaking clearly visible on the endocardial surface has given rise to the term "tigering." These histologic changes are comparable to those observed in experimental animals subjected to low oxygen pressures for long periods.<sup>20</sup>

#### CARDIAC MURMURS

That *systolic murmurs* develop frequently in patients suffering from anemia has been recognized for nearly a hundred years,<sup>1, 2, 4, 5, 7, 21</sup> and is commented on in almost every textbook discussion of the causes of murmurs. Of 46 patients studied by us, 32 had systolic murmurs of varying intensity. The incidence of maximum intensity was divided equally between the pulmonic area in the second or third interspace to the left of the sternum and the apex of the heart. However, since the murmur, when intense, is often audible over the entire precordium it may be difficult to determine whether one is dealing with a single murmur emanating from the pulmonic or mitral area or with the fusion of two murmurs arising from these areas. Both murmurs are high-pitched and blowing in character.

The causative factors for the production of systolic murmurs differ according to their location. In any condition in which the velocity of blood flow is increased a pulmonic systolic murmur is common. This is true following exercise, in pregnancy and in hyperthyroidism as well as in anemia. Hence the pulmonic systolic murmur of anemia might well be associated with an increase in the velocity of the blood, although the exact mechanism of its production is not clear. The apical systolic murmur may be due to a functional mitral regurgitation secondary to dilatation. The presence and intensity of systolic murmurs in our cases were roughly proportional to the amount of cardiac enlargement and to the severity of the anemia. Nineteen of the cases were followed, in 14 the murmur became less marked or disappeared as the anemia improved. Fourteen of these cases were also followed by serial x ray films, in 9 of the 10 in which there was a decrease in the murmur the heart size also diminished, whereas all 4 patients without change in murmur also showed no change in heart size.

*Diastolic murmurs* heard in conjunction with anemia are much less common than systolic, although their existence has been noted since 1861,

probably a relatively slow one, and one which would be likely to cause the improvement in the electrocardiogram to lag behind the improvement in the hemoglobin level

#### CONGESTIVE HEART FAILURE

Most patients with severe anemia complain of symptoms many of which are similar to those present in persons with impending or actual heart failure. Thus, dyspnea on exertion, palpitation

#### ANGINA PECTORIS

Several authors<sup>32 34 35 43 44</sup> have commented on the occasional occurrence of angina pectoris in patients with anemia. In our present series there is 1 such case and we have encountered several others at various times. The case record of the patient in this series is as follows:

H. L., a 65 year-old English artisan, had been followed at the Boston City Hospital since 1927 for pernicious

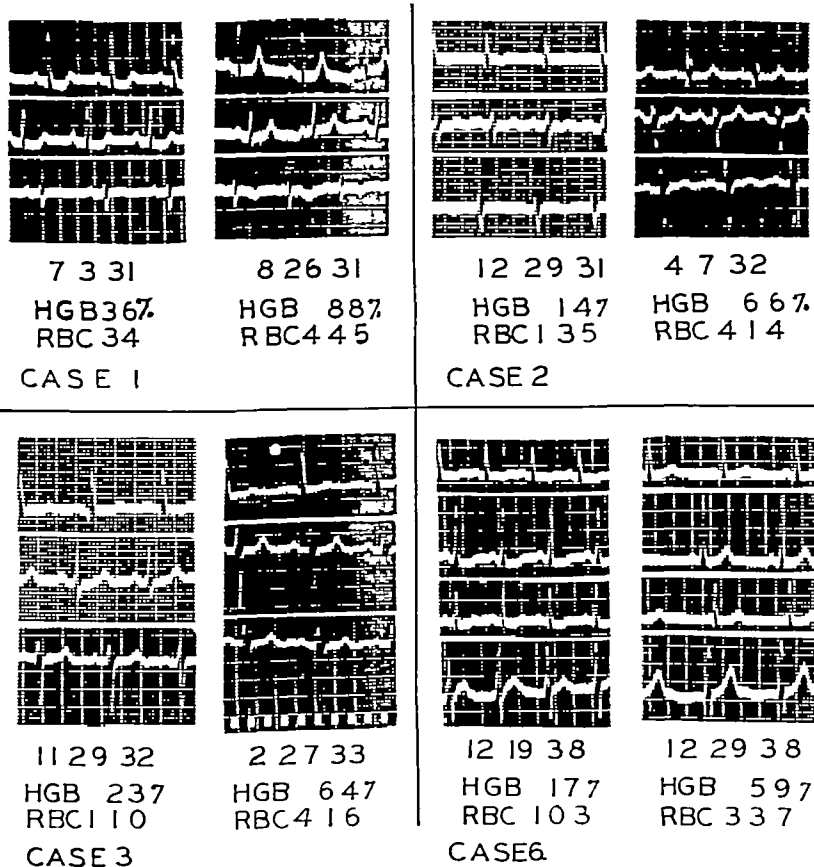


FIGURE 1 Electrocardiograms from Cases 1, 2 and 6 (hypochromic anemia) and Case 3 (pernicious anemia)

and dependent edema are of frequent occurrence. Of our 47 patients, 35 suffered from dyspnea on exertion of varying degree when first seen. Interestingly enough, the occurrence of dyspnea could not be correlated with the degree of anemia, nor did it bear any relation to age. In all the cases followed, the dyspnea improved markedly as the anemia was relieved. Twenty-one of our patients also had dependent edema, usually slight. The edema and dyspnea did not necessarily co-exist. Ten of the 12 patients with edema who were followed were completely relieved of it as the blood level returned to normal.

anemia. He had done well under liver treatment until August, 1931, at which time his physician told him that he had high blood pressure and hardening of the arteries and should eat no meat. He thereupon discontinued his liver and shortly thereafter began to experience increasing weakness, easy fatigue and dyspnea on exertion. Early in January, 1932, he commenced to develop typical angina pectoris, that is, squeezing precordial pain radiating down both arms, accompanied by a sensation of smothering and occurring on exertion especially in the cold air, and relieved by rest and nitroglycerin. As time went on this pain was brought on by less and less exertion. In early March there developed slight edema of the ankles and a sore tongue. The patient entered the hospital on March 21, 1932.

On physical examination the positive findings were a

been observed in experimental anoxemia.<sup>37</sup> The other 4 cases showed consistent changes in the T waves which could hardly be attributed to coincidence, to these we have added 4 similar cases which have come under our observation since the original study was concluded. The blood findings and corresponding electrocardiographic changes are shown in Table 1 and Figures 1 to 5

of varied etiology, and none of the electrocardiograms exhibited the sign so frequently encountered in this deficiency, namely prolongation of the Q-T interval. Furthermore, the electrocardiographic abnormalities appeared to be related to the degree of the anemia. The transient nature of the T-wave changes indicates that they were not due to any irreversible myocardial damage, and it

TABLE 1 *Electrocardiographic Changes Before and After Treatment in 8 Patients with Severe Anemia*

CASE No	DIAGNOSIS	AGE	HEMOGLOBIN (SAHLI)	RED BLOOD CELLS	FIRST ELECTROCARDIOGRAM	SUBSEQUENT OBSERVATIONS			
						PERIOD AFTER FIRST ELECTROCARDIOGRAM	HEMOGLOBIN (SAHLI)	RED BLOOD CELLS	ELECTROCARDIOGRAM
		yr	%	$\times 10^6$		days	%	$\times 10^6$	
1	Hypochromic anemia	70	36	3.4	T <sub>1</sub> T <sub>2</sub> diphasic ST <sub>1</sub> ST <sub>2</sub> depressed left axis deviation	49	88	4.45	T's normal ST's normal axis unchanged
2	Hypochromic anemia	61	14	1.35	T <sub>1</sub> low ST <sub>1</sub> ST <sub>2</sub> depressed	90	66	4.14	T's normal ST's normal QRS voltage increased axis further to left.
3	Pernicious anemia	84	23	1.10	T <sub>1</sub> low ST <sub>1</sub> depressed left axis deviation.	90	64	4.16	T's normal ST's normal axis further to left
4	Pernicious anemia	69	25	0.90	T <sub>1</sub> flat T <sub>2</sub> low QRS voltage low	35	75	4.35	T's normal QRS voltage increased
5	Acute myeloid leukemia	63	17	0.49	T <sub>1</sub> inverted T <sub>2</sub> diphasic ST depressed	11	25	1.30	T's normal ST's normal
6	Hypochromic anemia	22	17	1.03	T <sub>1</sub> inverted ST <sub>1</sub> ST <sub>2</sub> ST <sub>3</sub> depressed	10	59	3.37	T's normal ST's normal
7	Pernicious anemia	73	19	0.72	T <sub>1</sub> T <sub>2</sub> T <sub>3</sub> flat QRS voltage low	7	30	1.31	T <sub>1</sub> T <sub>2</sub> low T <sub>3</sub> flat QRS voltage low
						14	38	3.04	T's normal QRS voltage increased.
8	Pernicious anemia	35	8	0.40	T <sub>1</sub> T <sub>2</sub> T <sub>3</sub> flat ST <sub>2</sub> depressed.	3	8	0.50	T <sub>1</sub> flat T <sub>2</sub> upright T <sub>3</sub> low
						8	28	1.30	T <sub>1</sub> low T <sub>2</sub> T <sub>3</sub> normal.
						12	40	1.75	T <sub>1</sub> flat T <sub>2</sub> T <sub>3</sub> voltage increased
						17	47	2.06	T's normal

The highest hemoglobin found in association with an initial abnormal electrocardiogram was 36 per cent, occurring in 1 case, in all the other cases the hemoglobin was 25 per cent or less. In the entire group there were 11 patients with initial blood levels of 25 per cent or less. Seven of these had abnormal electrocardiographic records which became normal as the anemia improved and in 1, although the record was within normal limits, there was considerable increase in voltage with improvement in the blood picture.

A fairly consistent pattern runs through these records, namely a depression of the S-T segment and flattening or inversion of the T wave in Lead 1 or both Leads 1 and 2. Although this pattern is similar to that produced by digitalis, the latter factor was ruled out in every case. The possibility of vitamin B deficiency is more difficult to exclude, since all the patients were suffering from chronic illness. However, none of them showed other signs of vitamin B deficiency, the anemias were

is quite possible that myocardial anoxia would account for them. Certain experimental and clinical studies have been made which indicate that myocardial anoxia produces changes of this nature in the electrocardiogram.<sup>23-42</sup> It is unlikely that cardiac dilatation alone would account for them although in the only 2 cases with abnormal electrocardiograms in which satisfactory x-ray measurements of the heart were obtained before and after treatment, pronounced dilatation was present, as evidenced by a decrease in the transverse diameters of the heart of 2.9 and 2.3 cm respectively. The level of hemoglobin at which myocardial anoxia occurs in an individual case logically depends on the adequacy of the coronary circulation. This would account for the tendency noted in this series for electrocardiographic changes to be found more commonly in older patients. It is possible that fatty changes in the myocardium also have an effect on the electrocardiogram. This also is presumably a reversible change, although

probably a relatively slow one, and one which would be likely to cause the improvement in the electrocardiogram to lag behind the improvement in the hemoglobin level

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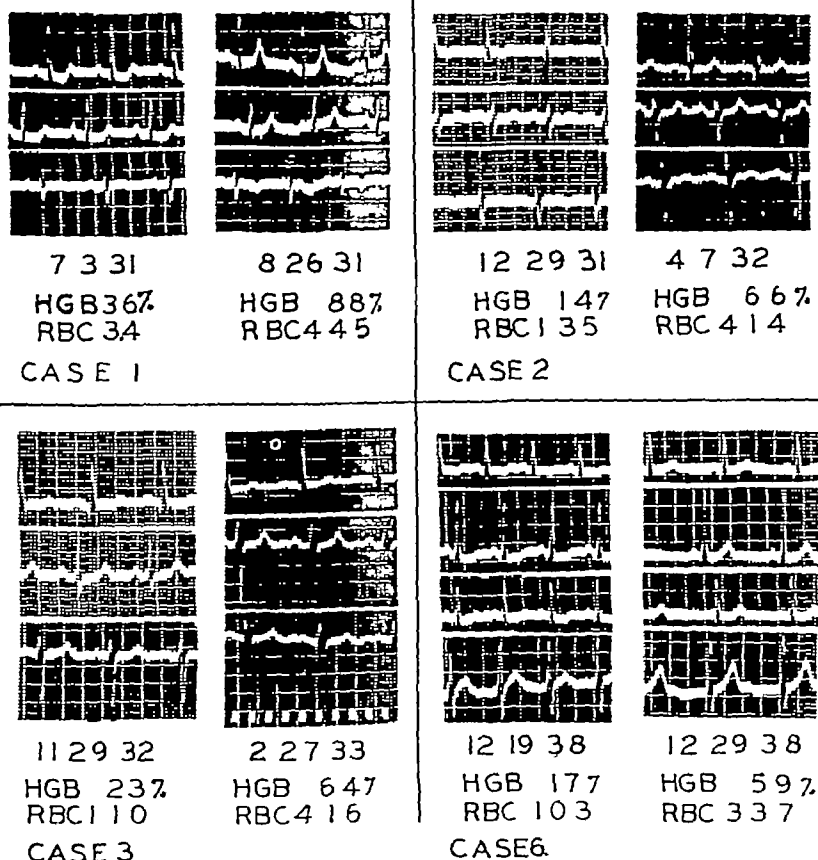


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On physical examination the positive findings were a

smooth tongue, moderate sclerosis and tortuosity of the peripheral arteries and poor heart sounds with no murmurs. The chest was emphysematous but there were no rales or abnormal breath sounds. The arterial blood pressure was 140/60. There was no edema. The hemoglobin was 44 per cent (Sahli) and the red blood-cell count 1,550,000. A teleroentgenogram of the heart showed it to be within normal limits, its transverse diameter being 12.1 cm. and the internal diameter of the chest 29.5 cm. An electrocardiogram was normal.

The patient was given intramuscular injections of liver extract and rapidly improved, so that on discharge, May 14, 1932, the angina was completely gone and there were no other symptoms. At this time the hemoglobin was 63 per cent and the red-blood-cell count 2,300,000.

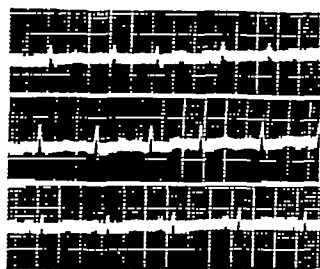
The patient returned for a check up on July 1, 1932 and reported that he had had no recurrence of his angina or any other symptoms. Examination of the heart showed

However, many such patients if relieved of their anemia live for many years with no recurrence of anginal pain.

#### DISCUSSION

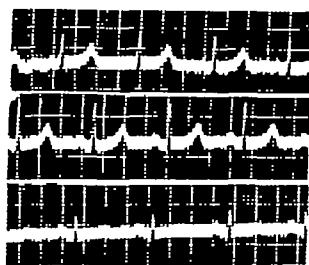
The clinical changes which have been observed to occur in the heart and circulation as the result of severe chronic anemia are all compatible with the alterations in cardiovascular physiology which are known to take place under such conditions.

Normally the oxygen-carrying power of the blood is far in excess of the requirements of the resting tissues, only one third of the available oxygen being removed from the blood in its circulation through the body.<sup>45</sup> It is thus apparent that, if no other compensatory forces come into play, when



3 25 37

HGB 25% RBC 090



5 3 37

HGB 75% RBC 435

FIGURE 2 Electrocardiograms from Case 4 (pernicious anemia)

no change. The blood pressure was 130/80, the hemoglobin 80 per cent and the red-blood-cell count 3,400,000. An electrocardiogram revealed no change from the previous one. X-ray examination of the heart demonstrated that the transverse diameter had decreased 1.3 cm. to 10.8 cm. The patient was observed once more on October 11, 1938, 6½ years after the original admission. During this interval the blood had been maintained at a normal level by liver extract, and there had been no angina or other symptoms. Examination of the heart showed no change, the blood pressure was 160/80 and the hemoglobin was 80 per cent. The electrocardiogram showed no change.

Since the cause of angina pectoris is generally accepted to be a disproportion between the need of the heart for oxygen and the available supply through the coronary circulation, resulting in anoxia of the cardiac muscle, it is understandable that this symptom should at times occur in patients with a profound deficiency in hemoglobin and hence in the oxygen-carrying power of the blood. In many cases of angina of this type the patient is of middle age or over and is probably suffering from some degree of atherosclerosis of the coronary vessels, hence the anemia may be considered merely to precipitate the pain in an individual who is already a potential candidate for it.

the hemoglobin falls to about 30 per cent of normal all the oxygen would be taken out of the blood. Actually, although there is an increased oxygen utilization in anemia,<sup>46, 47</sup> it is not necessary that it reach this extreme degree, for there is also a sharp rise in the cardiac output before the deficiency in hemoglobin reaches the level of 30 per cent. Observations have been made on experimental animals<sup>48</sup> as well as on human beings<sup>28, 29, 46, 47, 49-51</sup> which indicate that a progressive increase in cardiac output occurs in severe chronic anemia. The exact point at which this rise first occurs is in some dispute, but most reports indicate that it takes place at a hemoglobin level of about 50 per cent. Dautrebande<sup>49</sup> found in man that the cardiac output may be doubled when the hemoglobin is 30 per cent of normal and tripled when it reaches 20 per cent, although Richards and Strauss<sup>47</sup> did not find so sharp a rise at low hemoglobin levels.

The finding of an increased cardiac output is corroborated by the majority of the reported observations on the effect of anemia on the velocity of the circulation. While Tarr, Oppenheimer and Sager<sup>52</sup> and Porter<sup>12</sup> found very little change from



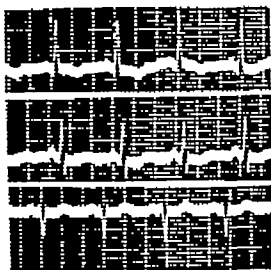
the normal, Bornstein,<sup>33</sup> Blumgart, Gargill and Gilligan,<sup>34</sup> Stewart, Crane and Deitrick<sup>35</sup> and Tung, Bien and Ch'u<sup>13</sup> all report an increase in blood velocity which appears to be proportional to the degree of the anemia.<sup>34</sup>

In contrast to the increases in oxygen utilization by the tissues, in the blood velocity and in the cardiac output, there is some decrease in the blood viscosity, and the circulating blood volume,<sup>30</sup> while usually within the limits of normal, is frequently somewhat reduced.

Two theories have been brought forward to explain the cause of the cardiac dilatation which occurs in anemia. One<sup>55</sup> is that it is due to in-

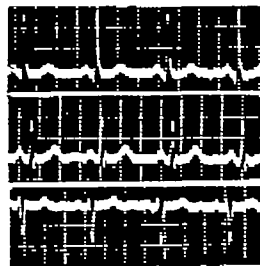
work, and it is possibly these hearts that are most likely to dilate.

In most cases the cardiovascular symptoms of which anemic patients complain, while superficially similar to those of impending or actual congestive heart failure, are not due to primary impairment of cardiac function, and these patients do not have heart failure. The primary deficiency is in the vehicle for oxygen transport, the hemoglobin. The circulation attempts to compensate for this by a greater peripheral oxygen utilization and by an increased minute-volume output of the heart, and does sufficiently compensate so that dyspnea at rest does not



9 8 37

HGB 17% RBC 049



9 21 37

HGB 25% RBC 130

FIGURE 3 *Electrocardiograms from Case 5 (aleukemic myelosis)*

sufficient oxygen supply to the heart itself because of the anemia, the other<sup>6 10 50</sup> is that increased work of the heart occasioned by increased cardiac output is the cause. Stewart et al.<sup>29</sup> deny that the heart in severe anemia is called on to do excessive work in spite of the increased minute-volume output. Since the work of the heart is as dependent on the level of the blood pressure as it is on the cardiac output,<sup>56</sup> these investigators found in their cases that, because of the lowered blood pressure, the calculated work of the left ventricle was no greater and often less during the anemic phase than at a time when the hemoglobin level was higher and the cardiac output less. It is, however, hazardous to apply their conclusions to all cases of anemia, for it should be noted that the blood-pressure changes in Stewart's cases were greater than in most of our cases with comparable changes in the blood level, and, moreover, the heart measurements of his patients were little if any increased above normal and showed very little decrease as the anemia improved. It is quite probable, therefore, that the hearts of anemic patients in whom there is comparatively little lowering of the blood pressure are obliged to do an increased amount of

work, and it is possibly these hearts that are most likely to dilate. But with the increased demands for oxygen during physical activity this compensation breaks down and dyspnea results. Similarly, the palpitation that occurs is merely the subjective manifestation of the tachycardia which is part of the compensatory response. The edema present is usually due to a low plasma osmotic pressure caused by deficient blood proteins, and is not produced by the increased hydrostatic pressure in the capillaries which takes place in heart failure.

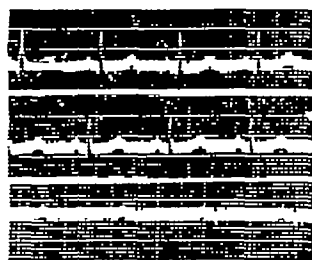
In primary heart failure there is not ordinarily an increase in cardiac output, in fact, the output is almost always normal or diminished, and the important factor is an inability of either the right or left side of the heart or both to expel the blood properly as it reaches it, with a resulting backing-up of the blood in the veins and capillaries of the peripheral circulation or the lungs, increase in venous pressure and loss of fluid into the tissue spaces leading to pulmonary or peripheral edema.

In rare cases, however, congestive heart failure is said to occur in patients with severe chronic anemia even in the absence of demonstrable organic heart disease. We have not encountered such a

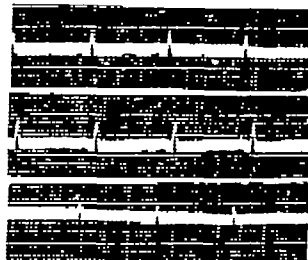
case, but Tung et al<sup>13</sup> report 6 cases. When heart failure ensues certain signs become manifest which are not present in the usual patient with anemia. These are pulmonary congestion with rales at the lung bases and the symptoms of orthopnea and cough, and peripheral venous congestion, shown by the distended jugular veins in the semi-recumbent position and enlarged tender liver and by direct measurement of the venous pressure.

Whether heart failure ever occurs in anemic patients without some additional burden or causative factor is doubtful, and difficult to determine. Tung mentions that extra physical demands such as marked physical exertion, fever

Although the physiologic effects on the circulation of primary heart failure and of anemia are thus different, the clinical symptoms and signs are frequently closely similar. Dyspnea, palpitation and edema and even angina pectoris may occur in both conditions, and in both one may find cardiac enlargement, murmurs, electrocardiographic changes and lowered blood pressure. Only too often physicians erroneously treat cases with unrecognized anemia as those of heart failure. The avoidance of such an error is of course easy if determination of the erythrocyte and hemoglobin levels of the blood is carried out, and clinically suspicion that the case is not one of true heart



3 1 1 36  
HGB 38% RBC 304



2 25 36  
HGB 19% RBC 072

FIGURE 4 *Electrocardiograms from Case 7 (pernicious anemia)*

and pregnancy or parturition are important precipitating factors. There are two other possible important causative factors which are difficult to evaluate. The first is the possibility that persons of middle age or over may develop heart disease and failure without a single specific sign's being demonstrable on physical examination of the heart itself or in the electrocardiogram. Hence all patients with anemia in this age group must be considered to have potential heart disease. The second point is that many patients who suffer from a severe grade of anemia, whether hyperchromic or hypochromic, are also suffering from one or more other deficiency states, because of inadequate diet or impaired gastrointestinal function. It is well known<sup>67</sup> that deficiency of vitamin B<sub>1</sub> may produce changes in the heart and circulation resulting in congestive heart failure, and hence it is not improbable that the heart failure which may appear to be due to anemia is in reality caused at least in part, by vitamin B deficiency. Indeed all the cardiovascular manifestations of anemia which we have described may in some cases, and to a greater or lesser extent, be due to the vitamin lack.

failure may be aroused by the absence of evidence of pulmonary and peripheral venous congestion, as shown by the lack of orthopnea and pulmonary rales and of distended neck veins in the semi-recumbent position.

A far commoner mistake is failure to recognize that in the presence of heart disease even a moderate degree of anemia may precipitate cardiac insufficiency. The changes in the circulation produced by anemia add a further burden to the already inefficient and overloaded hearts of such persons with cardiac disease. Not only does the presence of anemia produce a demand on the heart for an additional output of blood at a time when the oxygen supply to the heart is less efficient than normal, but the peripheral circulatory adaptation is also overburdened. Thus the extra load on the circulation of anemia frequently is responsible for initiating congestive failure in patients with heart disease, for aggravating the decompensation and delaying recovery when once failure has occurred, and for precipitating attacks of angina pectoris. It is of particular importance to bear this fact in mind, because of all the factors which may contribute to the occurrence of heart failure, con-

gestive or anginal, anemia is one of the easiest to diagnose and one of the most amenable to treatment

#### SUMMARY AND CONCLUSIONS

A study is reported on a series of 47 patients with severe chronic anemia without other evidence of heart disease. Thirty-one of these patients were followed after relief of the anemia.

Twenty of the 38 cases whose hearts were studied

ilar abnormal electrocardiographic findings are cited. With the exception of 1 patient, all the records occurred in patients whose initial hemoglobin levels were 25 per cent or less. One abnormal electrocardiogram consisted of an auriculo-ventricular nodal rhythm, the remaining 8 tended to show a consistent pattern of change, namely a depression of the S-T segment and a flattening or inversion of the T waves in Lead 1 or both Leads 1 and 2.

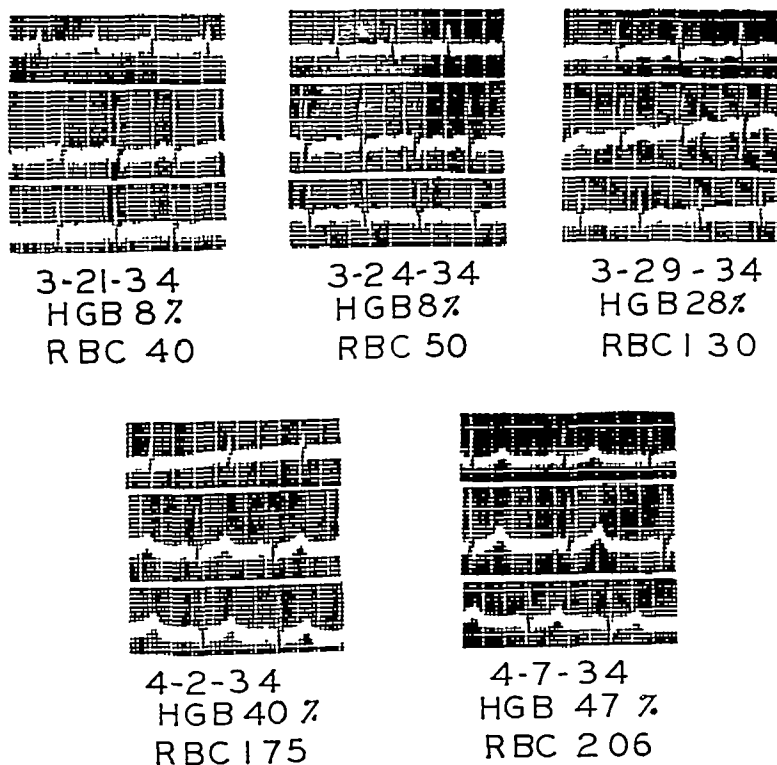


FIGURE 5 *Electrocardiograms from Case 8 (pernicious anemia)*

by x-ray showed cardiac enlargement, and of the 26 who were followed 18 showed a decrease in heart size with improvement of the hemoglobin level.

Thirty-two of 46 patients exhibited systolic murmurs. In 14 of the 19 who were followed the murmur became markedly less or absent. One patient had an "aortic" diastolic murmur which disappeared with improvement.

The anemia tended to produce a lowering of the systolic and diastolic arterial blood pressures.

Of the 45 patients studied by electrocardiogram, 10 showed abnormal records. In a group of 29 patients who were followed, 7 showed abnormal records, of which 5 became normal as the blood level increased. Four additional patients with sim-

The causation of the cardiac abnormalities is discussed and correlated with the clinical symptomatology, and with the changes in the cardiovascular physiology known to take place. It is emphasized that patients with anemia are often erroneously diagnosed as suffering from heart disease, and also that since anemia is an aggravating burden in persons with organic heart disease it is important that it be recognized and treated in such cases.

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## DELIRIUM TREMENS A STUDY OF CASES AT THE BOSTON CITY HOSPITAL, 1915-1936\*

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BOSTON

AT THE Boston City Hospital alcoholism is among the commonest medical diagnoses made. The number of alcoholic patients admitted is conservatively estimated at a minimal figure of 2500 per year (and may actually be 3000 cases or more§), and the expense to the City of Boston of caring for alcoholic persons is variously estimated between \$500,000 and \$1,000,000 per year, not counting loss of earnings due to illness associated with excessive drinking. This figure includes, of course, the cost of care in penal institutions and the handling of alcoholics by the municipal court.

Most striking among these alcoholic patients are those who suffer from delirium tremens. In the period between 1915 and 1935, 2375 persons with delirium tremens were admitted, out of 38,376 alcoholic patients (Table 1). The number varies

Alcoholic cases have constituted approximately 5 per cent of all admissions to the Boston City Hospital in the last seventy years. Among all the alcoholic cases those suffering with delirium tremens constitute an average of 6.2 per cent, though this figure has risen as high as 15 per cent (as in 1918) and was 11 per cent in 1935. The sustained rise shown in the last five years is quite marked.

The increase in admissions because of alcoholism is disproportionate to the growth of the hospital, but the addition of new facilities has enabled it to care for an increasing number of alcoholic individuals.<sup>1</sup> The situation in Boston affecting the hospital care of alcoholic persons has been more or less unique in that no hospital has been entirely willing to accept them for care except in the most acute emergency.<sup>2</sup> It is of great interest to note that the trend in the incidence of alcoholic psychoses in Massachusetts as reported by Guthrie and Dayton and in New York is very similar to that exhibited by the number of admissions to the Boston City Hospital during the same period.<sup>3</sup>

The care of patients with acute forms of alcoholism is a heavy burden when gauged in terms of the nursing and medical attention needed, and this is particularly true when delirium tremens occurs. In this condition the danger of death is great, and the mortality is high because delirium tremens constitutes a major ordeal for the patient's entire system, accompanied or preceded as it may be by intoxication, disturbed nutrition, exhaustion and exposure of various types. Table 2 gives the number of deaths from delirium tremens compared with the total number of patients admitted with delirium tremens to the Boston City Hospital from 1915 to 1935. In this period, 2375 patients with delirium tremens were admitted and 560 (approximately 24 per cent) died. The significance of this finding may be emphasized by noting that over the twenty-one-year period included in this study, the ratio of deaths among patients with delirium tremens varied from 52 to 12 per cent, with an average of 24 per cent. During the last ten years there has been a gradual decrease in the ratio of deaths among cases of delirium tremens admitted to the hospital.

Information concerning the number of deaths

TABLE 1 *Number of Cases of Delirium Tremens Compared with All Cases of Alcoholism Admitted*

YEAR	NO. OF ALCOHOLIC PATIENTS	NO. OF CASES WITH DELIRIUM TREMENS	PERCENTAGE
1915	523	31	6
1916	1,197	128	11
1917	1,301	155	12
1918	566	86	15
1919	564	56	10
1920	728	41	6
1921	1,322	51	4
1922	2,474	99	4
1923	2,916	140	5
1924	2,641	131	5
1925	2,057	92	4
1926	2,066	100	5
1927	2,031	113	6
1928	2,182	94	4
1929	2,092	55	3
1930	2,126	71	3
1931	2,184	146	7
1932	2,399	143	6
1933	2,291	136	6
1934	2,420	264	11
1935	2,296	243	11
Totals	38,376	2375	Average 6.2

considerably from year to year. It rose from 71 cases in 1930 to 243 cases in 1935, an increase of from 3 to 11 per cent of all alcoholic patients.

From the Neurological Unit, Boston City Hospital, and the Department of Diseases of the Nervous System, Harvard Medical School.

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§Certain alcoholic cases admitted with complications such as pneumonia, fractured skull and so forth are sometimes not formally classified as alcoholic. The variety of complications observed in patients with delirium tremens is demonstrated in Table 4, which shows the terminal causes of death.

among cases of delirium tremens compared with deaths among all cases of alcoholism is given in Table 3. Among 2015 deaths due to alcoholism at the Boston City Hospital occurring between 1915 and 1935, 560 were cases of delirium tremens. The percentage varied from 35 per cent in 1915 to 7 per cent in 1932, with an average of 28 per

admissions. Deaths were commoner in the fifth decade for men and in the fourth for women. The sex and age distribution among patients dying with delirium tremens shows the greatest number of deaths among men in the same period, especially between thirty-six and forty years of age. Among women with delirium tremens most deaths occurred in the forty-one to forty-five year age group. Among fatal cases of delirium tremens, the predominance of men over women is very striking, and should be kept in mind in any discussion of the incidence of alcoholism at the Boston City Hospital. It must also be borne in mind that the

TABLE 2 Deaths Among Patients with Delirium Tremens in Relation to the Total Number of Admissions of Those with Delirium Tremens

YEAR	NO OF ADMISSIONS WITH DELIRIUM TREMENS	NO OF DEATHS FROM DELIRIUM TREMENS	PERCENTAGE
1915	31	16	52
1916	128	46	36
1917	155	57	37
1918	86	24	28
1919	56	8	14
1920	41	5	12
1921	51	7	14
1922	99	20	20
1923	140	30	21
1924	131	34	26
1925	92	35	38
1926	100	31	31
1927	113	29	26
1928	94	33	35
1929	55	16	29
1930	71	16	23
1931	146	27	18
1932	143	28	20
1933	136	28	21
1934	264	37	14
1935	243	33	14
Totals	2375	560	Average 24

cent. When the deaths among cases of delirium tremens are compared with those among all cases of alcoholism, it can be seen that since 1930 the former have increased very slightly compared with the striking increase of deaths among the latter. Some features of this increase have been commented on by Dr. Timothy Leary,<sup>4</sup> medical examiner of the southern district of Suffolk County, who has shown that deaths due to alcoholism are also increasing in the non-hospitalized population of Greater Boston.

In the last seven years the tendency at the Boston City Hospital has been toward improvement in nursing care, which fact may well have contributed to lowering the number of fatal results among the cases of delirium tremens. A similar decrease has been noted in other clinics. Piker and Cohn<sup>5</sup> state that the mortality in 1910 in one reputable clinic was 37 per cent, but has decreased in the last ten years to 10 or 12 per cent through rational treatment. Since 1842 according to Chadwick,<sup>6</sup> deaths from alcoholism have formed a large group in records of vital statistics in Massachusetts.

In previous studies<sup>7-8</sup> it was shown that men admitted to the Boston City Hospital for alcoholism outnumbered women five to one. An even greater preponderance of men is noted among cases of delirium tremens (Fig. 1). Among all alcoholic

TABLE 3 Deaths Among Cases of Delirium Tremens Compared with Deaths Among All Cases of Alcoholism

YEAR	NO OF CASES WITH ALCOHOLISM	NO OF CASES WITH DELIRIUM TREMENS	PERCENTAGE
1915	46	16	35
1916	126	46	37
1917	149	57	38
1918	54	24	44
1919	34	8	24
1920	28	5	18
1921	21	7	33
1922	66	20	30
1923	103	30	29
1924	118	34	29
1925	108	35	32
1926	68	31	46
1927	80	29	36
1928	79	33	42
1929	82	16	20
1930	73	16	22
1931	118	27	23
1932	101	28	28
1933	123	28	23
1934	230	37	16
1935	208	33	16
Totals	2015	560	Average 28

figures given can only suggest the magnitude of the problem as it is seen in the hospital, and that the numbers reported are minimal in terms of the total incidence of delirium tremens. They are only a partial index of actual conditions in the

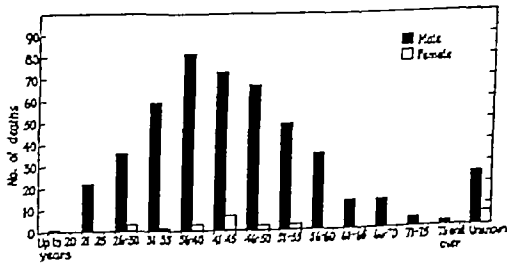


FIGURE 1 Age and Sex Distribution of Deaths in Patients with Delirium Tremens Admitted to the Boston City Hospital 1915-1936

community. Even for the hospital these figures do not overstate the problem. As has been stated, many patients who are actually suffering from alcoholism are admitted because of, and are formally

diagnosed in terms of, the complication that occasions their admission to the hospital pneumonia, fractures, digestive or nutritional disturbances, neuritis and so forth. For a long time many patients suffering from delirium tremens and other forms of alcoholism have been necessarily refused admission to the hospital for various reasons. Until 1917 a record was kept of these patients to whom admission was refused (Fig 2), but since 1917

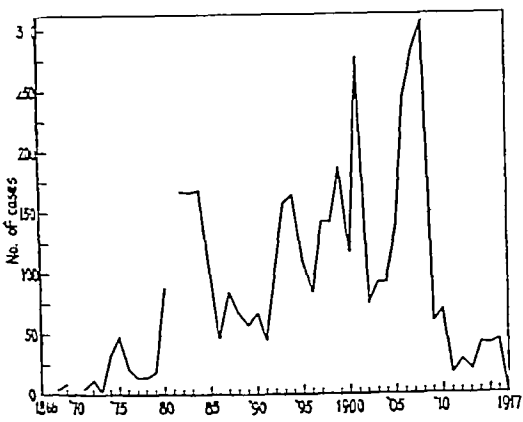


FIGURE 2. Number of Patients Refused Admission to the Boston City Hospital on Account of Delirium Tremens and Alcoholism 1866–1917

detailed information regarding their number has not been available.

Very few patients with delirium tremens die without complications (Table 4). The majority of cases in this series had serious medical and surgical conditions of which terminal pneumonia was the commonest. Dilatation of the heart was often diagnosed in fatal cases. Commonly seen, also, were conditions resulting from head injuries. Many infections occurred, with and without trauma.\*

A medical problem which involves such extensive need for nursing care and medical treatment is deserving of serious consideration by municipal authorities. It is probable that cycles of increased and decreased incidence of alcoholic admissions to general hospitals will continue unless provision for more effective treatment and prevention of alco-

holism is developed. It has frequently been pointed out that the alcoholic personality is distinctly a neurotic one,<sup>13-16</sup> and that the most effective treatment employs psychological and psychotherapeutic measures. A program in preventive medicine and public health is needed in communities faced with this problem, the basic principle of such a program must be the adequate care of the alcoholic personality in the early stages of the condition and as soon as the need becomes apparent.

No program of prevention can succeed unless there is an organized interest in the alcoholic patient as an individual, and a realization that not all such patients<sup>1b</sup> are beyond medical assistance.

SUMMARY

Between 1915 and 1935, 38,376 patients suffering from alcoholism were admitted to the Boston City Hospital, of this group, 2375 were diagnosed delirium tremens. This figure represents a yearly average of about 250 cases or 6.2 per cent of all cases of alcoholism.

There has been in recent years a marked increase in admissions for alcoholism, and this in-

TABLE 4 Principal Causes of Death Among Patients Suffering with Delirium Tremens

CAUSE OF DEATH	NO. OF CASES
Delirium tremens	153
Pneumonia	135
Dilatation of heart	80
Brain injuries	27
Heart injuries	24
Multiple injuries	19
Scalp wounds	10
Erysipelas	10
Septicemia	9
Pulmonary edema	6
Cellulitis	3
Ulcers	3
Burns	2
Pentostillar abscess	2
Pulmonary tuber ulosis	2
Injuries to neck	2
Postoperative hernia	1
Cholecystitis	1
Alcoholic cirrhosis	1
Bronchitis	1
Heat prostration	1
Hematemesis	1
Epilepsy	1
Streptococcal infection	1
Undetermined	65
Total	560

crease has been noted as well among cases with delirium tremens. In 1930, delirium tremens cases among all alcoholic cases constituted 3 per cent and in 1935 11 per cent.

There has been a high incidence of fatal outcome among delirium cases, amounting in the period reported to 560 deaths. Although admissions of patients with delirium tremens have increased in recent years, there has been observed a marked decrease in deaths from 52 per cent in 1915 to 14 per cent in 1935. There has not been a corresponding decrease in deaths among all cases of

An evaluation of the causes of death in cases of delirium tremens is difficult. However two groups seem to stand out, those in which the cause of death was directly related to alcoholism and those in which the relation was only indirect or coincidental. Cases of pneumonia are a complication of delirium tremens although studies by Weichselbaum,<sup>17</sup> Grawitz,<sup>18</sup> and others indicate that alcoholism and the associated vitamin deficiencies cause a diminution in resistance to bacterial infections. Cases with dilatation of the heart are most frequently due to the vitamin deficiency associated with alcoholism which has been proved to be analogous to beriberi heart disease by the studies of Weiss and Wilkins.<sup>19</sup> A large number of alcoholic patients die from direct involvement of the brain due either to the neuritis, pellagra or to Wernicke's disease, both of which conditions may involve the vital centers of the brain. In the case of the former Wernicke's disease may be recognizable grossly particularly if the lesions are associated with hemorrhages, but this cannot be observed in all cases. In the absence of visible hemorrhage, a very experienced pathologist may recognize the bluish-gray discoloration of the periventricular tissue as suggestive of Wernicke's disease. A neuritis of the pellagra or the beriberi type can be recognized only microscopically. Advanced neuritis of the vagus nucleus should be accepted as a cause of death, as pointed out by Alexander.<sup>12</sup>

alcoholism in this period. In 1932, the deaths among cases of delirium tremens represented only 7 per cent of all those due to alcoholism, and has varied between this number and a high level of 46 per cent in 1926.

Men predominate among patients dying from delirium tremens at the Boston City Hospital, and are found in a higher percentage in the group suffering a fatal outcome than in the entire group diagnosed as having delirium tremens. Most of the men who died were between thirty-six and forty years of age, and the women were between forty-one and forty-five.

Many persons suffering from alcoholism and delirium tremens have been refused admission to the Boston City Hospital because of lack of facilities for their care. The proper treatment and disposal of these patients is a constant and expensive burden to the city (and the Commonwealth as well), and is worthy of a carefully planned and extensive program which would tend to prevent the serious secondary complications of alcoholism.

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## TRANSMISSION OF ENCEPHALOMYELITIS IN THE HORSE AND POSSIBLE VECTORS IN THE HUMAN BEING\*

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IT SEEMS probable that equine encephalomyelitis has existed in the United States for at least a century, and possibly longer, and that it occurred in New England long before the outbreak recognized in the summer of 1938. However, information about the disease has been developed only during the last decade, beginning with the discovery of the Western type of virus by Meyer, Haring and Howitt<sup>1</sup> in 1930. In that year these workers investigated an epizootic of encephalitis which appeared among horses in irrigated districts of the San Joaquin Valley in California. As in our recent local outbreak, the first cases were recognized early in July. The incidence increased gradually throughout August, and reached a peak about the middle of September, when the disease appeared with explosive swiftness in every part of the valley. With the onset of cooler nights there was a rapid decrease and after November the disease disappeared. Infections occurred in California for the next two years, beginning with the hot weather in June or July and, except for sporadic cases ending with cool weather

It was noted that communities affected in 1930 were relatively free of the disease in 1931 and 1932. During the latter years the condition spread over much of the western half of the United States. There was an increase in incidence during the later years of this epizootic, the attack rate being about 10 per cent in 1930, while in 1931 and 1932 it varied in newly infected areas from 20 to 80 per cent. Infection occurred in animals of all ages. The mortality was estimated at about 50 per cent, but it varied in different communities from 25 to 70 per cent.

Because of the failure to find evidence of obvious connection between cases, it was suspected that the disease had been spread by unrecognized carriers. Various other features of the disease suggested the possibility of insect transmission, and experimental attempts were made to transmit the disease through horse flies (*Tabanus punctifer*), but with negative results.

*Isolation of Western Type of Virus* The California workers<sup>1-6</sup> isolated a filterable virus which differed immunologically from the virus of Borna disease, and from the virus of poliomyelitis, which was epidemic in California at that time. They also

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described the pathologic lesions of the disease, and suggested the term "equine encephalomyelitis"

*Location of Virus in Horses* These and later studies indicate that in infected horses the concentration of infective virus is greatest early in the disease. Virus was recovered from the cerebrum, pons, medulla oblongata and spinal cord, but not from the liver, spleen or kidneys. It has also been obtained from spinal fluid, and from the cardiac and peripheral blood during the febrile period, but rarely after the development of neurologic symptoms.

*Susceptible Experimental Animals* Using various methods, including cutaneous and intranasal inoculation, the virus has been transmitted to various animals, including horses, mules, guinea pigs, white mice, white rats, rabbits, monkeys and gophers. As a rule the mortality is higher in young animals, and the most valuable diagnostic animals are young guinea pigs and white mice. In 1933 Giltner and Shahan<sup>7</sup> observed that sheep, dogs and cats were resistant, that calves developed the disease, but some recovered, also that after intracerebral inoculation pigeons died in three days, while white Leghorn chickens were resistant. They suggested that calves and pigeons might be concerned in the epizootology of the disease in nature. This possibility is strengthened by the work of Fothergill,<sup>8</sup> who has isolated the Eastern type of virus from a naturally infected pigeon obtained in the region of the recent epizootic in Massachusetts.

*Eastern Type of Encephalomyelitis* During the summer of 1933 a disease resembling the California epizootic was recognized among horses in Virginia, Delaware, New Jersey and Maryland. The clinical symptoms and seasonal distribution were much the same, and the virus was pathogenic for the same species of laboratory animals. However as has been shown by Ten Broeck and his associates,<sup>9-10</sup> this disease, which was designated as the Eastern type of encephalomyelitis, differed as follows: its virus was immunologically distinct, its mortality was higher, and unlike the Western disease it was most prevalent in regions near salt marshes. Others who contributed to our knowledge of the Eastern type include Records and Vawter,<sup>11-13</sup> Giltner and Shahan<sup>7</sup> and others.

*Experiments in Transmission by Mosquitoes* Prior to 1933, nothing definite was known about the transmission of equine encephalomyelitis. However, its epidemiology presented features suggesting that insects might be a factor. These included the seasonal distribution of the disease, its tendency to occur near waterways and swampy lands, its greater prevalence in rural areas among animals

kept in pasture at night, and the lack of evidence of contact between individual cases. Records<sup>14</sup> noted that while the disease could be transmitted experimentally by intranasal instillation, normal horses stabled with infected ones did not contract the disease through contact, or through eating or drinking from the same containers.

During 1933, Kelser,<sup>15</sup> working in the laboratories of the Army Medical School in Washington, discovered that the virus of the Western type of the disease could be transmitted from infected to normal guinea pigs and to horses through *Aedes aegypti*.

In the spring of 1934, other workers at the Army Medical School (Simmons and Reynolds<sup>16</sup>) incriminated *A. albopictus*, which is a common Oriental mosquito and also breeds in houses. This work was done with a colony of *A. albopictus*, started from eggs shipped from Manila and maintained at the Army Medical School for teaching and experimental purposes. While this mosquito is not indigenous here, it is an effective vector of dengue fever and yellow fever, and its incrimination as a transmitter of equine encephalomyelitis may be of practical importance in Oriental countries.

Later in 1934, Merrill, Lacaille and Ten Broeck<sup>17</sup> reported transmission of both the Western and Eastern type of viruses by *A. sollicitans*, and of the Eastern type by *A. cantator*. These are salt-marsh mosquitoes, both of which have been found in Massachusetts (Davis,<sup>18</sup> 1938).

Early in 1935, Madsen and Knowlton<sup>19-20</sup> in Utah transmitted the Western type of virus through *A. nigromaculis* and *A. dorsalis*, and later that year Kelser<sup>21</sup> in New England incriminated *A. vexans*. During 1938 Kelser,<sup>22</sup> working at the laboratory of the Army Medical Research Board in Panama, transmitted Western virus with *A. taeniorhynchus*.

The detailed mechanism of the transmission of the virus by these mosquitoes still requires much study. The work of Merrill and Ten Broeck<sup>23</sup> with *A. aegypti* indicates that to ensure transmission the normal mosquitoes should feed on the infected animal early—or as soon as the animal's temperature reaches 40.5°C, which usually is from eighteen to thirty hours after its infection. After an incubation period of four or five days the mosquito can transmit the virus by biting, and it remains infected throughout its life. Actual tests were made up to three months after infection.

Working with *A. sollicitans*, Merrill and Ten Broeck<sup>24</sup> reported that this mosquito was first able to transmit the disease seven days after feeding on suspensions of infected guinea pigs brains, eleven days after feeding on infected guinea pigs and twenty days after feeding on an infected horse.

These workers also proved that when normal *A. aegypti* were fed with suspensions of macerated infected ones, virus was transmissible directly from one mosquito to another through seventeen passages and probably indefinitely. This may have epidemiological significance.

These preliminary studies implicate eight species of *Aedes* mosquitoes as potential vectors of encephalomyelitis, and it seems probable that additional species of mosquitoes and other insects are also concerned in the natural spread of the disease. In this connection, the recent (1936-1937) discoveries of Syverton and Berry<sup>25-27</sup> are of great interest. They have shown that *Citellus richardsonii*, the gopher or Richardson ground squirrel of the Northwest, is susceptible to the Western type of virus, also that the tick (*Dermacentor andersonii*) may serve as a vector of this virus, which survives in it through all stages of the developmental cycle, including the egg, and has been transmitted by larvae nymphs and adult ticks from infected to normal guinea pigs and gophers.

Thus, in considering the question as to the spread of encephalomyelitis in nature we are confronted with an abundance of known potential vectors, including at least eight species of *Aedes* mosquitoes and one species of tick. Undoubtedly other vectors will be incriminated. We have no exact knowledge concerning lower animal reservoirs of virus, but the available experimental data indicate the need for an extensive investigation of many species of domestic and wild animals and birds.

Because of the unusual prevalence of mosquitoes in New England during the summer of 1938, it is suspected that one or more of the species present were responsible for the epidemic of encephalomyelitis. However, this has not been proved. Adequate information concerning the relative prevalence throughout the year of the different species normally present in this region is not yet

available. Furthermore, in no case has the virus been demonstrated in trapped mosquitoes.

It therefore appears that before one can intelligently discuss the transmission of this disease either among horses or in man, much fundamental investigation must be done.

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## REPORT ON MEDICAL PROGRESS

### TUBERCULOSIS

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BROOKLINE

THE following subjects have been selected as worthy of comment in a brief review of the important and practical advances in the study of tuberculosis that have been reported during the current year: the present status of the tuberculosis problem in Massachusetts, the importance of searching the gastric contents for tubercle bacilli, the frequency of tuberculous infection of the bronchi and trachea and the results of such infection, the problem presented by latent or asymptomatic tuberculosis with positive x-ray but no symptoms, pulmonary tuberculosis as an occupational hazard in student nurses and medical students, non-caseating tuberculosis—is it the same as “sarcoid disease”? recent attempts at statistical evaluation of the results of compression therapy, extrapleural pneumothorax—the newest surgical measure for treating pulmonary tuberculosis, vitamins in the treatment of pulmonary tuberculosis, and the use of sulfanilamide in experimental tuberculosis.

#### THE TUBERCULOSIS PROBLEM IN MASSACHUSETTS

The death rate from pulmonary tuberculosis in this state continues to fall. In 1937 it was 40.0 per 100,000 population, in 1938 it was 34.9. There are now 4472 sanatorium beds for the treatment of this form of tuberculosis, and for the first time there is no material delay in the admission of the patients to any of the county or state institutions. This is a source of great satisfaction, because regardless of our feelings about socialized medicine in general it is evident that public funds must be used if we are to isolate the open cases of pulmonary tuberculosis which are spreading the disease, and give the patients in the favorable stages the necessary sanatorium treatment.

#### TUBERCLE BACILLI IN GASTRIC CONTENTS

The importance of the search of the fasting gastric contents for tubercle bacilli was again called to the attention of the medical profession in papers by Stadnichenko and Cohen<sup>1</sup> and Gourley<sup>2</sup> at the meeting of the National Tuberculosis Association in 1937. It is surprising that these investigators should so often find tubercle bacilli in the gastric contents of children with the apparently benign childhood type of the disease. Since the publica-

tion of these papers examination of the gastric contents has become a routine in many sanatoriums in the study of cases not raising sputum. Again the number of positive reports is surprising. In the recent edition of *Diagnostic Standards* the National Tuberculosis Association insists that a patient is not to be classified as “apparently cured” until, “in case there is no sputum, the fasting gastric content has been obtained and thoroughly examined.”<sup>3</sup>

There is one possible error in this procedure, namely, that harmless acid-fast bacilli may be mistaken for tubercle bacilli. However, guinea-pig inoculations have shown that this mistake occurs in only a small percentage of cases.

#### TRACHEOBRONCHIAL TUBERCULOSIS

In the entire field of pulmonary disease one of the most important advances in the last twenty years has been the recognition of varying degrees of bronchial obstruction and its effect on that part of the lungs supplied by the bronchus involved. Three degrees of bronchial obstruction can be recognized clinically if we remember that the normal bronchus widens on inspiration and narrows on expiration: an obstruction so slight that it allows air to enter easily on inspiration but impedes its flow on expiration, causing a wheeze, an obstruction which allows air to enter on inspiration but completely closes the bronchus on expiration and thus traps air in the portion of the lung supplied by that bronchus (obstructive emphysema), a complete obstruction of the bronchus which does not allow any air to enter and results in atelectasis of the lung.

All three degrees of bronchial obstruction are found in pulmonary tuberculosis. Bronchoscopic examination shows that the obstruction in such cases is due to a tuberculous process in the bronchi themselves.<sup>4,5</sup> This process may be a discrete, shallow ulcer, hyperplastic granulation tissue, fibrostenosis, which is the healed stage of the foregoing processes, tuberculoma resembling a tumor, or obstruction by a tuberculous gland pressing on the bronchus or ulcerating through its wall. Bronchoscopists estimate that in 10 per cent of all cases of pulmonary tuberculosis there is an associated tuberculosis of the bronchi. Occasionally the tuberculous infection is limited almost entirely to the

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bronchi Tuberculosis carriers with positive sputum but little x-ray evidence of pulmonary tuberculosis fall into this class

The symptoms of advanced tuberculous bronchitis are wheezing, marked dyspnea, distressing paroxysmal cough, difficulty in raising sputum and fever and malaise caused by retained secretion Increasing cough and expectoration may be the result of bronchiectasis<sup>6</sup> which has developed in the area beyond a partial obstruction

Tuberculosis in the bronchus also plays a part in the formation and persistence of pulmonary cavities Giant or "tennis-ball" cavities<sup>7</sup> are frequently caused by a tuberculous process partially obstructing the bronchus and acting as a ball valve which allows the entry but not the exit of air, and thus produces a "tension" or positive-pressure cavity These cavities may be very difficult to close by artificial pneumothorax or thoracoplasty Even if the cavity is closed, the sputum may remain positive because it comes from the infection in the bronchus itself

When there is complete atelectasis of one lobe or an entire lung without evidence of tuberculosis in the remaining portion of the lungs, x-ray diagnosis is difficult In such cases a mistaken diagnosis of bronchiogenic carcinoma is sometimes made

Bronchial tuberculosis, like tuberculous laryngitis, may heal spontaneously, but if it is extensive enough to be recognized clinically the prognosis is usually unfavorable Emphasis is therefore being placed on the early diagnosis and treatment of this complication So far no satisfactory treatment has been devised but such procedures as the following are being tried deep x-ray therapy, general ultraviolet light treatment, and local treatment through the bronchoscope with silver nitrate, live wire cautery, electrocoagulation,<sup>8</sup> localized ultraviolet light<sup>9</sup> and mechanical dilatation of stenosed bronchi In special cases tuberculomas and glands which have ulcerated into the bronchus have been removed through the bronchoscope

#### LATENT OR ASYMPTOMATIC TUBERCULOSIS

It is now customary to x-ray the lungs of large groups of supposedly well people or of those with indefinite symptoms There are few more difficult problems in medical practice today than the clinical evaluation of such x-ray films Serial x-rays may show progression of a tuberculous process for months or years before symptoms develop There is not even elevation of temperature, so that the old idea that the activity of a tuberculous process can be determined by the thermometer has long since been discarded Some of these latent lesions develop into manifest or fatal disease, others clear without giving symptoms and become the scars

and calcifications so common at autopsy How, then, shall we select the cases needing treatment in the asymptomatic phase?

An unusually clear and practical discussion of this problem was presented by Amberson<sup>10</sup> at the meeting of the Massachusetts Medical Society in June, 1938 "Sound judgment," he said, "depends on a careful correlation of all factors which can be identified and estimated in the individual case" He pointed out the dangers of infection in the adolescent girl, in the Negro race and in people of low social economic status with exhausting occupations He stressed the importance of recency of contact in infancy and during or shortly before adolescence "The intensity of the tuberculin reaction is no indicator of the probable behavior of latent lesions," but "long-standing allergy" as shown by the tuberculin test "is associated with an increasing relative immunity against the tubercle bacillus" Contrary to repeated statements by eminent authorities, he maintained that a first infection beyond the age of childhood should be treated with the same care as a reinfection at these ages Multiple or larger lesions demonstrated by x-ray, he asserted, were of more significance than single or small ones, basal lesions were no more important than apical ones

If we can rely on blood studies to tell us whether or not a given lesion is active, white-cell counts, differential counts and red-cell sedimentation rates should be of particular help in the study of asymptomatic lesions Unfortunately, as Amberson points out, "normal findings do not exclude the possibility that a latent lesion is dangerous or even actively progressive" Nevertheless, abnormal findings in the blood are important and should be considered in the decision as to treatment There is a danger in overemphasizing their significance

#### TUBERCULOSIS IN NURSES AND MEDICAL STUDENTS

Attention is being focused on the number of cases of pulmonary tuberculosis developing in college students, medical students and student nurses<sup>11</sup> The subject was considered of sufficient importance to give it a place on the program of the general assembly of the Congress of American Physicians and Surgeons in Atlantic City in May, 1938, the paper was by Soper and Amberson<sup>12</sup> The percentage of positive tuberculin reactors, they reported, is higher in the East than in the Middle West and in the city than in the country Studies made in eighty-five colleges reveal that on admission from 30 to 50 per cent of the students have positive tuberculin tests and at graduation from 35 to 60 per cent In the medical schools on admission from 60 to 70 per cent of the students have positive tests and at graduation from 85 to

95 per cent In the nursing schools in this country about 60 per cent have positive tests on admission and 90 per cent at the end of a three years' course of training These figures show how quickly medical students and nurses are infected by tubercle bacilli

When routine x-ray examinations are made, 0.6 per cent of the college students show true pulmonary tuberculosis In the medical schools 1.5 per cent of the students give x-ray evidence of pulmonary tuberculosis on admission and an additional 1.5 per cent develop it during the four-year course Only about half of the students in these two groups are treated for active disease Figures for the nursing schools are somewhat higher, especially where tuberculosis wards are connected with hospitals In the United States from 30 to 60 per cent of the student nurses have x-ray evidence of disease, and about half of them require treatment These figures are disturbing but not alarming, for by improvement of the nursing technic the number of students developing x-ray evidence of the infection in one school was reduced from 5.5 to 1.6 per cent

One other interesting problem which is being settled by such studies is that of the immunity conferred by slight degrees of tuberculous infection In the nurses it has been possible to determine whether the individual giving a positive tuberculin test is less likely to develop pulmonary tuberculosis after exposure on the wards than the one who has a negative tuberculin test The figures now obtained in this country support those published a number of years ago by Heimbeck, of Oslo, and there seems little doubt that tuberculous infection sufficient to give a positive tuberculin test affords a certain amount of immunity Heimbeck's figures, quoted by Soper and Amberson,<sup>12</sup> are as follows: of 625 student nurses with positive tuberculin tests who nursed patients with active pulmonary disease, 20 developed pulmonary tuberculosis and there were no deaths, of 280 negative reactors, 57 developed pulmonary tuberculosis and there were 10 deaths Heimbeck draws the conclusion that tuberculin allergy is tuberculin immunity

If girls under twenty are to be allowed to nurse tuberculous patients strict precautions must be taken, but to observe the same precautions as in the nursing of scarlet fever patients seems unnecessary All general hospitals admit some patients with pulmonary tuberculosis, usually before the diagnosis is made, and the nurse may be caring for an open case without knowing it For this reason certain hospitals are now requiring a routine chest film on all patients admitted

#### NON-CASEATING TUBERCULOSIS AND SARCOID DISEASE

Strangely enough, three groups of specialists working in different fields have "discovered" a disseminated disease occurring in the lungs and many other organs of the body which is histologically and roentgenographically like tuberculosis but runs a comparatively benign course Tuberculosis specialists have spoken of "cold" tuberculosis, chronic miliary tuberculosis, torpid forms of disseminated tuberculosis and hematogenous non-miliary pulmonary tuberculosis Dermatologists have found that "sarcoid disease" of the skin is histologically like non-caseating tuberculosis and that it is frequently associated with glandular enlargements and cystic bone changes The chest x-rays of these cases often show enlarged hilus glands something like Hodgkin's disease, miliary lesions indistinguishable from miliary tuberculosis or a combination of glandular and parenchymal lesions Ophthalmologists now recognize a form of uveitis<sup>13</sup> clinically resembling tuberculosis of the eye but often associated with parotitis, and accompanied by a negative reaction to strong dilutions of tuberculin rather than the expected positive reaction to very weak dilutions This tuberculin anergy is present in most of the cases of the phthisiologist and also the dermatologist

In the past year Pinner<sup>14-16</sup> has reviewed the extensive literature on these conditions and presents a sound argument that they are all forms of non-caseating tuberculosis He maintains that if the lesions could be studied very early tubercle bacilli would be found, but that because of some peculiarity of the infecting organism or the resistance of the host, the atypical "cold" lesions develop rather than the characteristic lesions of tuberculosis Furthermore, he cites a case of sarcoid disease which after many years of observation changed into true caseous tuberculosis In a series of cases observed by Hunter at the Massachusetts General Hospital, however, both the glandular and miliary lesions disappeared after a few months of general hygienic care

Typical chest x-rays of sarcoid disease may occur with erythema nodosum and rheumatic fever This is of interest because erythema nodosum has been considered a form of tuberculosis Five per cent of the nurses in Heimbeck's series quoted above developed erythema nodosum in the course of their training

From the standpoint of prognosis it is important to realize that there is a group of diseases which may be confused with lymphoma or miliary tuberculosis, possibly representing an atypical form of tuberculous infection, and as a rule benign<sup>17 18</sup>

## STATISTICAL EVALUATION OF COLLAPSE THERAPY

In the last ten years a great change has taken place in the treatment of pulmonary tuberculosis. In the eastern part of this country, at any rate, those well qualified to judge believe that about 70 per cent of the patients in the sanatoriums should be treated by artificial pneumothorax, phrenic nerve paralysis or thoracoplasty. However, statistics to support this strong clinical impression have been difficult to obtain, and we now have the statistician Drolet<sup>10</sup> maintaining that "most of such studies have limited themselves to the immediate results of treatment and are an incorrect or incomplete measure, they should deal rather with the ultimate results." He concludes "Sanatorium or surgical treatment of pulmonary tuberculosis would seem so far to have had little effect upon the case fatality rates of the entire tuberculous population in the communities studied." "Case fatality rate" means the ratio of deaths in a given community to the new cases reported in that community during the same period of time. For example, in Massachusetts in 1915 there were 8046 new cases reported, with 4194 deaths. In 1935 there were 3594 new cases, with 1814 deaths. The case fatality in 1915 was therefore 52 per cent and in 1935 had dropped to only 50 per cent. He goes on to analyze the figures relating to cases discharged from the sanatoriums in the United States, and shows that in 1925 the mortality ratio to the total discharges alive or dead was 20 per cent, while in 1934 it was 24 per cent. He states "It may, therefore, be concluded from the obvious decline of tuberculosis and the comparatively slight change in the case fatality rate that the preventive aspects of isolation in tuberculosis hospitals have been far more effective than those arising from sanatorium or medical treatment." The proportion of all tuberculosis cases which are now isolated in sanatoriums has increased remarkably in the past twenty years. For instance, in the state of New York in 1915 only 8 per cent of the total tuberculosis cases were isolated in hospitals, whereas in 1934 the figure had reached 34 per cent.

Drolet's only conclusion in favor of collapse therapy is that "persons dying from tuberculosis now are slightly older [3 to 5 years] than formerly."

The clinician is somewhat mystified by these indirect conclusions but is forced to reckon with them. Perhaps it is true that collapse therapy in the far-advanced cases which make up so large a percentage of the sanatorium population will prolong life but not greatly influence the mortality rate. In that case greater emphasis should be placed on early diagnosis and treatment, and we

are again faced with the problem of the asymptomatic lesion. In any event, no physician who has followed carefully a large group of cases treated with collapse therapy will be willing to give up the procedure because of Drolet's figures.

## EXTRAPLEURAL PNEUMOTHORAX

New methods of collapse therapy and changes in the technic of the older methods are constantly being introduced. During the past year attention has been drawn to extrapleural pneumothorax.<sup>11-13</sup> In many cases it is impossible to establish a satisfactory intrapleural pneumothorax because the visceral and parietal pleurae are adherent. In some of these cases the surgeon can remove a section of a rib and strip the parietal pleura from the chest wall, allowing the collapse of the underlying lung. This collapse can then be maintained by injections of air between the chest wall and the parietal pleura using the method employed to inject air between the visceral and parietal pleurae in intrapleural pneumothorax. If the patient's condition allows thoracoplasty most surgeons prefer it, if not, extrapleural pneumothorax can be established with a minimum of shock. This treatment may be sufficient in itself or may improve the patient's condition so that thoracoplasty can be performed later.

The possible complications of extrapleural pneumothorax are tuberculous infection in the extrapleural space, and rupture of a large tuberculous cavity into it as a result of the separation of the lung from the chest wall. As in all collapse treatment, there must be a rigid selection of cases, and the surgeon should not be pushed into operation "just because there is nothing else to do."

## VITAMIN THERAPY IN PULMONARY TUBERCULOSIS

Many years before the present vitamin craze, cod-liver oil proved its value in the treatment of tuberculosis, and in recent years vitamins D and C have been used extensively in the treatment of intestinal tuberculosis. Many people think that it is the vitamin and not the accompanying ultraviolet light treatment which is responsible for the improvement in these cases. In recent studies of vitamin C it has been found that tuberculous patients have a very low urinary excretion of this substance. As a result, many institutions have given their patients concentrated vitamin C. No conclusive articles have appeared to date, but there seems little doubt that in an appreciable number of cases it does increase the appetite and therefore helps in the essential upbuilding process.

## SULFANILAMIDE IN EXPERIMENTAL TUBERCULOSIS

At a time when sulfanilamide is being used so extensively in the treatment of various bacterial

infections it is right that its effect should be tested in the laboratory on the growth of tubercle bacilli in the test tube and in animals. Experiments to date indicate that in certain concentrations sulfanilamide does exert an inhibitory effect upon such growth.<sup>23-25</sup> There are as yet no reports on the use of the drug in tuberculosis in human subjects.

Sulfapyridine, too, is being subjected to the same laboratory test and experiments are under way to produce a form of sulfapyridine which can penetrate the fatty capsule of the tubercle bacillus. Needless to say, the time has not yet come to use these drugs on cases of tuberculosis occurring in general practice.

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# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25231

### PRESENTATION OF CASE

A fifty-year-old female Negro nurse was admitted complaining of fever, generalized aching and sore throat of three weeks' duration.

For the past fifteen years the patient had had occasional attacks of very severe pain in the right upper quadrant, sudden in onset, requiring opiates for relief and associated with nausea and vomiting. They lasted about two days and were followed by tenderness and weakness. There was no jaundice. They recurred about every six months, the last being one year before entry. For the past seven years she had had aching and stiffness in various joints, often localized in the hands and occurring in wet weather. Three years before admission she was admitted to an outside hospital for "double pneumonia" and acute rheumatic fever, remaining there for three months. Following this she had frequent dry cough throughout the winter. Three weeks before entry she was awakened with a severe shaking chill and definite malaise. The chill lasted about ten minutes and the temperature rose to 104°F. She had slight headache. Her physician stated that she was ill with a "bad heart" and gave her digitalis. There was generalized aching, a sore throat and sore mouth. Her temperature remained at 101 to 103°F for three days then fell to under 99.5°F for ten days. After the acute illness she complained of great weakness though her appetite was excellent. Eight days prior to admission her temperature rose to 100°F and she complained of gas in her abdomen. There was distention relieved by heat and an enema. She began having two or three bowel movements daily, with well-formed brown stools. She also noted pain under both shoulders and severe pain across the upper anterior chest which was not increased by respiration. Associated with this was rapid heart action. At about the same time drowsiness developed and on one occasion she complained of numbness throughout the right side of the body, except the face, which lasted for only a few hours. There was no paralysis, and complete recovery ensued. A severe dry cough developed. Back pains were noted and slight tenderness in the right wrist. Two days later

anorexia developed accompanied by frequent gas pains. An enema gave good results and relief. Two days before entry her temperature was 102°F and her sore throat seemed to be returning. On the following day her abdominal distention was again relieved by heat and an enema. Her physician found a negative abdomen, the chest clear, but a temperature of 101°F. She had had no urinary symptoms and her urine had been light colored. There had been no jaundice. She had had two children and one miscarriage.

Physical examination showed an obese, perspiring, restless woman obviously ill and in a semistupor condition. There were frequent attacks of dry, brassy coughing. Examination of the fundi oculi was negative. The tongue was red in the center, the sides were coated. The anterior tonsillar pillars showed a dusky redness covered with dry, white, glairy mucus. The chest was clear. Frequent squeaks were heard over the trachea. The heart rate was 100, the rhythm was regular. The heart was somewhat enlarged to the left. There was a soft systolic murmur at the apex. The blood pressure was 186 systolic, 98 diastolic. The abdomen was obese and soft, with diffuse tenderness in the epigastrium. Pelvic examination was negative. There was no edema. The reflexes were equal and normally active.

The temperature was 103°F rectally, the pulse 115, and the respirations 40.

Examination of the urine showed a specific gravity of 1.028 and was negative except for the presence of 5 white cells per high-power field. A urine culture showed no growth. The blood showed a red-cell count of 4,560,000 with 64 per cent hemoglobin, a white-cell count of 25,900 with 89 per cent polymorphonuclears, no abnormal cells in the blood smear. Agglutination tests for typhoid, paratyphoid and undulant fever were negative. A van den Bergh was normal, indirect. Two blood cultures showed no growth. A throat culture showed a moderate growth of beta-hemolytic streptococcus. A lumbar puncture showed an initial pressure of 180 mm. There were no cells. The total protein was 17 mg per 100 cc, sugar 169 mg, and the goldsol curve 0100000000. A spinal-fluid Wassermann test was weakly positive. An electrocardiogram showed a rate of 110 with normal rhythm. The P-R interval was 0.18 second, QRS duration 0.12 second. T<sub>3</sub> was inverted, QRS 1, 2, 3 and 4 notched.

On the third hospital day physical examination was essentially unchanged. There were questionable rales at both bases, but examination was difficult because of a large obese chest wall. There was no stiff neck. Reflexes were hypoactive. Neurological examination was otherwise negative.



On the following day she was mentally dull and still acutely ill. She complained of joint pain and pain across her upper abdomen. There was limitation of motion of the right wrist with pain, and some pain on moving the right elbow. The abdomen was greatly distended in the upper half and rigid over the left upper quadrant. Palpation in the upper abdomen apparently caused pain. No peristalsis was audible in this region. A surgical consultant found that the upper abdomen was extremely tender especially in the left upper quadrant. Spasm could not be determined because of obesity. Peristalsis was normal. She had not vomited. Examination of the urine at this time revealed a trace of bile. Her white-blood-cell count ranged between 15,000 and 27,000. An x-ray film of the chest revealed no evidence of pulmonary disease. On the following day a gastric aspiration showed 400 cc of recently ingested fluid which was guaiac negative. The stool was brown, liquid, a guaiac test was negative.

The abdomen was tapped in three different places and nothing was found. On the sixth hospital day rales were heard at both bases. A chest film showed some consolidation in the medial portion of the left lung. Her temperature, pulse and respirations had remained essentially the same since entry. She rapidly failed and died on the eighth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. ALVAH H. GORDON \* When I was given the opportunity of speaking here, I said, "Timeo Danaos et dona ferentes," and now I have much sympathy with Daniel when he was introduced into the lion's den. I am not familiar with the rules of this game, but I believe all the pertinent information is on this sheet. If it is, I am afraid I am in trouble.

On reading this story, one is impressed by the first few words, "A fifty-year-old female Negro nurse complaining of fever, generalized aching and sore throat of three weeks' duration." Of course that would immediately suggest an agranulocytosis, but as one looks farther down he realizes that there is nothing in that, because the white-cell count is 25,900 with 89 per cent polymorphonuclears. The next thing we come across is the statement that for fifteen years she had had severe pains, in the right upper quadrant of the abdomen, of sudden onset and occurring frequently. The obvious inference is that an obese woman has suffered from attacks of cholelithiasis, which is a reasonable supposition. Then having taken that for granted, if we may do so for a few moments, we

pass on and go through the story and find the development of sore throat from an acute infection with the *Streptococcus hemolyticus* which any of us might develop whether we had acute cholecystitis or not. Then later on she developed a pain in the upper abdomen of a quite acute type, and in one instance it is stated that there was some spasm in the left upper quadrant. The acute pain in the upper abdomen and the tender areas both suggest the possibility of pancreatitis which had developed on the basis of previous cholecystitis. There are two or three things which are against that, however. There is one which directly suggests it. The cerebrospinal fluid sugar was 169 mg per 100 cc. which would indicate that possibly the blood sugar may also have been elevated even though there was no sugar in the urine. We have no figures for the blood sugar so we have to infer without having actual knowledge. However, there are two strong points against the diagnosis of acute pancreatitis. One is that there was no vomiting, and so far as my own experience goes, acute pancreatitis without vomiting must be a very rare occurrence. Another interesting point is that a surgeon saw her and apparently nothing was done. That is considered significant. So, while it is all very true that an acute pancreatitis might very reasonably give rise to her abdominal symptoms, there are some things which it does not account for. It does not account for the fact that she had pain over the upper portion of the chest, and while her temperature and pulse were of moderate range her respirations were definitely elevated beyond the rate which would be suggested by the elevation of the temperature and pulse. Just here one must interrupt oneself and speak again of the disease which when it is diagnosed is rarely present, and when present is rarely diagnosed, that is periarteritis nodosa. There is no doubt that this story throughout might quite readily be present with periarteritis nodosa. One of the very few cases which I have seen came on with an extreme sore throat, such as this patient had, and at the same time with many signs in the chest indicating the presence of pneumonia, and without any suspicion of the disease (periarteritis nodosa) until it was found postmortem.

To come back to the thing that offers the most likely explanation there is scattered from place to place throughout the story, evidence that this woman had had acute rheumatism, and at various times, pains here and there in certain joints. They are specifically stated as being present in joints. She had fever. Then she developed a sore throat, with the finding of a hemolytic streptococcus. That, too, is a pretty common occurrence in the presence of rheumatic fever or rheumatic infec-

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tion More than that, with the onset of acute infection, the acute manifestations of rheumatic disease may appear Among these is acute pericarditis We find the statement that her heart was somewhat enlarged to the left, to say nothing about the right No mention is made as to whether she had or had not a pericardial friction I think it would be unwise to mention that even if it were present

DR. TRACY B MALLORY We would not hold anything like that back Everything is here, sir

DR. GORDON But I am still more like Daniel in the lion's den To me, looking at it from that standpoint of the most likely explanation of the story, the upper abdominal pain is quite compatible with acute pericarditis, as are also the pain across the front of the chest and the rapid respirations, and the background of rheumatic infection and infection of the throat, and the development of the terminal symptoms which she showed There is one point that is difficult to explain under the present circumstances, that is the high cerebrospinal fluid sugar There is no evidence that she had any of the intracranial causes for such elevation

Perhaps I might see the x-ray films of the chest

DR. A THORNTON SCOTT Is that correct about the cerebrospinal sugar? I do not remember anything about its being elevated

DR. MALLORY It is down as that in the record

DR. GEORGE W HOLMES Unfortunately these are portable films and do not give so much information as they should She has a very high diaphragm with obesity The lungs are less clear than I would expect them to be in an ordinary film The films were taken with the patient lying on her back at a rather close distance and the apparent, wide heart shadow is not so reliable a finding as in films taken the regular way The first films were taken on the twenty-eighth, and this one on the thirty-first, three days later The last film is so distorted that we will have to discard it as being of very little value I do not see anything in the lung field that I would interpret as being abnormal The heart shadow is certainly somewhat increased in size in these films, but we have to take into consideration the things that I have already mentioned and discount that considerably However, I think it would be fair to say there is enlargement of the heart shadow The various chambers of the heart can be made out and there is only moderate increase in the supracardiac shadow That would be against an accumulation of fluid in the pericardium A small amount, 300 cc, might be present in such a case without showing any more distortion of the heart shadow than

this does Certainly there is no large amount of fluid and no evidence of fluid in the pleural spaces

DR. GORDON My final conclusion is that the probability in this case lies with acute hemolytic streptococcal infection and the development of rheumatic plastic pericarditis My own belief is that there was also a small amount of fluid present in the pericardial sac The other suggestions that I have mentioned in the beginning I believe were probably not correct (agranulocytosis, periarthritis nodosa, acute pancreatitis)

DR. JOHN H TALBOTT I admire Dr. Gordon's discussion Each morning on the visit we would go over the list of diagnostic possibilities and discard them one by one The last note on the record is the one that best expressed our sentiments This stated that we had no idea what the patient died of

#### CLINICAL DIAGNOSES

Pancreatitis?  
Perforated peptic ulcer?  
Bronchopneumonia

#### DR. GORDON'S DIAGNOSIS

Acute rheumatic pericarditis

#### ANATOMICAL DIAGNOSES

Acute rheumatic pericarditis  
Rheumatic myocarditis  
Chronic cholecystitis and cholelithiasis  
Pulmonary congestion and edema  
Obesity  
Cortical adenoma of the adrenal

#### PATHOLOGICAL DISCUSSION

DR. MALLORY The only clinical diagnosis we found listed on the autopsy permission sheet was obesity At postmortem examination the peritoneal cavity was absolutely negative except for a few areas of petechial hemorrhage low in the pelvis which I think were probably on a circulatory basis and insignificant The pericardium, in contrast, contained about 175 cc of turbid fluid, conclusive evidence of acute pericarditis The heart was considerably hypertrophied, weighing about 420 gm All the valves were absolutely negative The coronaries showed minimal atheroma with no significant narrowing The myocardium was a little abnormal in gross appearance, enough so that a frozen section was done at the time of autopsy That has since been confirmed with many other sections and I have seen only one other heart that contained as many Aschoff's nodules as this one That other instance, incidentally, also occurred in an individual

over fifty years of age but one who had had little or no previous evidence of acute rheumatic fever. There were a few stones in the gall bladder which I think account satisfactorily for the repeated episodes of pain in the right upper quadrant. A cortical adenoma of the adrenal about a centimeter in diameter was also found but apparently played no role in the symptomatology.

## CASE 25232

### PRESENTATION OF CASE

A seventy-three-year-old white woman was admitted complaining of pains across the upper abdomen of two weeks' duration.

For the past six months she had not been entirely well but had no definite symptoms. Three and a half weeks before admission she was thrown forward in a street car, suffered a twist and was somewhat dazed. She remained in bed for the next week. Two weeks before entry she noted the onset of upper abdominal pain located along an arc the center of which lay about 5 cm. above the umbilicus, the ends lying 10 cm. to each side of the umbilicus. The pains radiated from left to right and caused nausea and vomiting. She vomited practically everything she ate during the last two weeks. The pain did not awaken her at night and did not cause her to cry out but at times did cause her to double up. With the onset of the pain two weeks before entry she noted the appearance of a yellow tint to her skin. Both her urine and stools became very dark. She had not had numbness or tingling of the extremities. During the last six months she had lived by herself and had done her own cooking. Her appetite had been increasingly poor for nearly a year. She ate some meat about five times a week but only few vegetables and little fruit. She had lost some weight.

Physical examination showed a well-developed and nourished woman who was slightly but definitely jaundiced. The tongue was atrophic. There were no other definite physical findings. Pelvic and rectal examinations were negative. The blood pressure was 120 systolic, 70 diastolic.

The temperature was 99.2°F, pulse 70, respirations 20.

Examination of the urine was negative. The blood showed a red-cell count of 2,070,000 with 50 per cent hemoglobin and a white-cell count of 11,500 with 75 per cent polymorphonuclears. There was no achromia, but there was moderately marked variation in size of the red cells, some larger than normal. No oval cells were seen. There was considerable polychromatophilia and suppling in

the large cells, but no nucleated red cells were seen. The platelets were normal. A reticulocyte count was 14.9 per cent. The hematocrit was 24, cell volume 93. The icteric index was 25. A blood Hinton test was negative. Stools were of normal color and the guaiac test was negative.

X-ray films of the chest showed the right diaphragm to be unusually high in position. It was smooth in outline and suggested enlargement of the liver. There was an irregular density occupying the right cardiophrenic angle and there was also hazy density along the lung markings extending to the left base. The upper lung fields were clear. The heart shadow was a little prominent in the region of the left ventricle. The aorta was tortuous and there was calcification in the arch. A lateral view of the skull showed irregular thickening of the frontal bone due to frontal hyperostosis. A gastrointestinal series showed a normal gastrointestinal tract except for a small hiatus hernia. The Graham test was negative.

On the third hospital day the liver was found to be palpable 3 cm. below the right costal margin. The spleen was definitely palpable. Liver extract was given intramuscularly on the third, fourth, fifth, eighth, tenth, eleventh, twelfth and thirteenth days. On the fourth, fifth, sixth, seventh and eighth hospital days the reticulocyte counts were 11.5 per cent, 11 per cent, 13.9 per cent, 13.6 per cent and 14.2 per cent respectively. On the ninth hospital day the red-cell count was 2,590,000, hemoglobin (photometric) 80 gm., white-cell count 7600. No nucleated red cells were seen. A fragility test showed hemolysis beginning at 0.42 per cent saline and was not complete at 0.24 per cent saline. A control showed hemolysis beginning at 0.42 per cent, complete at 0.28 per cent. Tests for urobilin and urobilinogen in the urine were positive and the foam test bile was positive. Stool examinations continued to show normal color and a negative guaiac test. On the thirteenth hospital day the reticulocyte count was 15.4 per cent and four days later 22.7 per cent. The patient slept most of the time. Edema of the feet had developed. On the fifteenth and sixteenth hospital days she was disoriented. There was definitely less motion in the left cheek and mouth. Rales appeared at both lung bases. On the eighteenth hospital day her pulse became weaker. Asthenia increased. Shortly after midnight she became cold, dyspneic, had air hunger, became comatose and died.

### DIFFERENTIAL DIAGNOSIS

DR. F. T. HUNTER. I should like to make some comments on this history. To begin with, her appetite had been poor for nearly a year, she had

not been entirely well and for six months she had been doing her own cooking. We cannot judge about the cooking. It possibly was so poor that her appetite decreased, yet I think there is more behind her lack of appetite than her gastronomic endeavors in the kitchen.

We are not informed whether the ankle, the abdomen or the neck was injured. We shall have to leave that question aside for the moment. She was dazed. I think most people are when a car stops suddenly, or when they get hit,—particularly women.

She stayed in bed the next week. I am interested to know why. Was it because of the shock or pain, although the pain was not supposed to have come on until later? Did her doctor advise her to stay in bed, or did her lawyer? If it was her lawyer I presume we can neglect this whole accident as a cause of her subsequent illness.

Nothing is said about the character of the pain. We are told it was definitely localized in the upper abdomen and did not wake her at night. I should imagine it was colicky pain. It certainly was related somewhat to position, because when she was lying in bed at night it was better, or at least it did not bother her. Vomiting, however, continued. I should like to know whether she had medication. Did her doctor give her morphine? Old people will sometimes vomit after morphine or at least have nausea. At about this time it was noticed that she had a yellow tint to the skin. We would like to know whether it had been present before, or whether her doctor called her attention to it, that is, if she had a doctor.

The dark stools are apparently not due to blood because later on the guaiac test was negative. When in the hospital pernicious anemia was suspected because mention is definitely made that she had no numbness or tingling.

She probably had an inadequate diet. She had lost weight, but we do not know how much. Ordinarily, people are vague about loss of weight, if they lose twenty pounds or more they notice it, but "some" weight loss usually means five or six, possibly ten pounds. Her loss of weight may be due to the fact that she had not eaten much for a couple of weeks.

Physical examination states that she was well developed and nourished. If she had carcinoma in the abdomen involving the liver or bile ducts I do not believe that she would have shown good nourishment at the time of examination. Furthermore, I think she probably would have had a longer story of pain. The jaundice was definite. The tongue was atrophic. We have no knowledge as to whether or not it had ever been sore—pre-

sumably not. So in the physical examination we find a well-nourished woman with jaundice and an atrophic tongue and we think right away of pernicious anemia. The slight increase in temperature would go perfectly well with that diagnosis, but the temperature could also go with carcinomatosis.

"Examination of the urine was negative." If this is correct she certainly did not have obstructive jaundice because if you can see jaundice in the skin you are certainly going to have bile in the urine even by the crude test of shaking a test tube of urine.

So far we are thinking of pernicious anemia. The first thing that seems odd is that the white count is high and the polymorphonuclear count unusually high for this disease. There is no mention as to whether myelocytes were seen in the blood smear or whether the polymorphonuclears showed multiple lobulation such as you see in pernicious anemia. The variation in size of the red cells goes with any type of anemia of this severity. The next point of interest is that there were no nucleated red cells found. They were thinking of cancer metastases in the bone marrow. The reticulocytes were 15 per cent. The first thing that comes to mind is hemolytic jaundice. I have seen a blood smear of a child with this disease with 87 per cent reticulocytes. The cell volume was higher than normal. If the cell volume is based on the recorded two million count, according to my figures it should be 116, but I presume there was another count done on the venous blood which brought that figure down to 9.3. It would be helpful to know whether the van den Bergh was diphasic or indirect. The stool was normal in color, with no blood. We would like to know whether she had been given any liver extract either by mouth or by injection by the doctor who took care of her before she came in, that is if she had a doctor. The icteric index of 25 is high. I should think for pernicious anemia with a red count of two million.

We have no definite information in regard to the date of this x-ray film of the chest, whether it was made just before death, or on entry to the hospital. I should like to know why the skull plate was taken. Were they looking for metastases, Paget's disease, or were they still looking for something resulting from the streetcar ride? If the gastrointestinal series is normal I should like to be sure that there is no displacement of the duodenum by tumor in the region of the pancreas. The Graham test was negative, and therefore I think the van den Bergh test would have been indirect if it had been done, because with a diphasic van den Bergh, the Graham test is

usually positive, that is, the gall bladder fails to fill, or fills only faintly. May we see the x-ray films?

DR. GEORGE W. HOLMES: The record states that the diaphragm was high on the right. I think it is, but I would not be at all certain that it was due to a large liver. It may be. In the other films where the liver is particularly well seen it does not seem to be enlarged. I do not see the spleen. She has something in her lung in the angle between the diaphragm and the heart which could be a destructive process or collapse. That may account for the high position of the diaphragm. These films were probably taken at full inspiration and anything that would cause her to fix her diaphragm on that side would also account for the high position. I think the films actually offer less information than one would assume from reading the record. The gall bladder is rather faint but is about normal in size and contracts after food, and I think we have to interpret it as negative. This film of the skull shows exostoses in the frontal region which so far as I know are of no importance.

DR. HUNTER: What about the date of the chest film?

DR. TRACY B. MALLORY: The chest plate was taken on the tenth day.

DR. HUNTER: She died on the eighteenth. It seems that we derive no further information from the x-ray examinations. The important information we do obtain about this patient comes from her course in the hospital. The liver was palpable 3 cm. below the costal margin. I assume that was found after the x-ray report was turned in. The spleen was said to be palpable on the third day and that corresponds to the time when the visiting man probably felt it. Liver extract was given. The first question we want to bring up is whether or not she was given potent material, because if a potent extract is given we do not usually see pernicious anemia developing a reticulocyte count so high as this and having it remain constant. On the ninth hospital day the red-cell count had apparently increased by a half a million, the white-cell count had fallen somewhat, and they kept looking for nucleated red cells.

DR. MALLORY: A potent extract was given from the start.

DR. HUNTER: In pernicious anemia the spleen is enlarged and palpable in a small percentage of cases, perhaps 15 or 20 per cent. Nowadays we are apt to find very few enlarged spleens because patients are diagnosed and treated before they have the anemia long. The fact that there were no nucleated red cells is against this being metastatic tumor in the bone marrow. In relation

to a diagnosis of hemolytic jaundice, the fragility was normal. Moreover, I should be amazed to find a woman of seventy-three with congenital jaundice manifesting itself for the first time at her age. I do not believe the foam test on the urine was positive, because urates often give a yellowish red color to the foam.

Suddenly, on the seventeenth day, the reticulocytes jumped to 22.7 per cent. We want to know whether this was a delayed response, or a terminal attempt of a pernicious anemia marrow to turn out red cells. In regard to the tendency to sleep we should have to inquire into the medication given. The edema of the feet was probably mild cardiac failure plus anemia in a woman of seventy-three.

She became drowsy, and there was definite evidence of something happening in the right cerebral hemisphere because of the evidence of paralysis on the left side of the face. The rales heard could have been due to cardiac decompensation, or to a hypostatic pneumonia. The rest of the story tells nothing except that she finally died.

When we go back over this whole story there are several things that make us consider this a case of pernicious anemia which has failed to respond to treatment. The possibility of hemolytic jaundice I am going to discount right away because of her age and the lack of other evidence. I am going to say definitely that I do not think the streetcar accident had anything to do with her death because she had a normal abdomen, and I do not believe that had there been an injury to a viscus she would have had a perfectly normal abdomen. To account for the pain, she might perfectly well have injured her spine, otherwise I cannot account for it.

I am going to make a diagnosis of pernicious anemia which failed to respond, and, possibly, cerebral thrombosis. She probably had a terminal pneumonia and, perhaps, mild congestive failure. Whether or not a spinal injury will be found, I do not know. Those are the diagnoses that I have to stand by, but I feel like the musician playing a Debussy quartette, who said after he got through that he knew every note was wrong, but he did not dare change it because he might be right.

DR. MILTON H. CLIFFORD: The story this woman gave when she came in was just as troublesome as Dr. Hunter has found it. I believe it was her lawyer who told her to go to bed for the first week. She had had very little medical attention. Her family had known that she was not in good health but nothing came to a head until this accident, the details of which could not be obtained any more satisfactorily than has been recorded here. She was fairly well nourished. She had had no liver therapy before entry so far as

we know. On entry probably the reason the liver was not felt is that she held herself quite rigid and had some distention at the time. The results of abdominal examination varied, although the liver could be felt and a mass in the left upper quadrant could be made out which I presumed to be spleen. She continued to be drowsy the whole of her course and did not respond to liver therapy.

DR. WYMAN RICHARDSON: I think it is fair for me to say that I was more impressed by the upper abdomen than the examiner who is quoted in the record and I was not so certain that it was spleen we felt. The other thing I should like to say is that I am much interested in the picture like this that simulates hemolytic anemia. I have seen it in another case of the same type and the remembrance of that case led me to make a fairly good guess in regard to this one. I think it probably will not be a hemolytic anemia, but there may be another cause for the jaundice and the reaction of the bone marrow may be the reaction to this disease that Dr. Mallory is going to tell us about.

DR. MALLORY: You did not think that the spleen was palpable?

DR. RICHARDSON: I did not, but Dr. Clifford thought that it was.

DR. HUNTER: Where am I left then?

#### CLINICAL DIAGNOSIS

Carcinomatosis

#### DR. HUNTER'S DIAGNOSES

Pernicious anemia  
Bronchopneumonia (terminal)  
Cerebral thrombosis?  
Congestive failure (mild)?

#### ANATOMICAL DIAGNOSES

Carcinoma of the pancreas with metastases to the liver  
Pernicious anemia  
Bacterial endocarditis, acute terminal, mitral and aortic  
Jaundice, slight

#### PATHOLOGICAL DISCUSSION

DR. MALLORY: The autopsy on this patient showed a carcinoma of the body and tail of the pancreas which had grown around the splenic artery and vein and practically occluded them. The spleen weighed only 100 grams so I feel quite sure it was not felt and the mass must have been pancreas. The liver was two-thirds or three-fourths replaced by carcinoma although it was only moderately enlarged. We rather thought at the end of the autopsy that we had satisfactorily explained

the case and we assumed that the anemia without much question was due to widespread metastases to the bone marrow and could be classed as myelophthisic anemia. When the sections came through we found that this was not the case. There were numerous sections of bone marrow without the slightest evidence of metastases and the bone marrow was entirely consistent with pernicious anemia. It shows a marked red-cell hyperplasia with considerable numbers of megaloblasts. Ordinary types of anemia almost never show megaloblasts in significant numbers, and in this hospital in adults we have seen such large numbers of megaloblasts only in pernicious anemia and two cases of benzol poisoning. So I am inclined to believe that she did have pernicious anemia. Possibly she had the very similar macrocytic anemia that is occasionally seen in liver insufficiency. I cannot rule that out. She had one other complication which I think unquestionably had a good deal to do with the exitus, that was a terminal bacterial endocarditis. She had no examination of the head, but I imagine that was embolism from bacterial endocarditis.

DR. HOLMES: Was there any gross change in the shape of the liver?

DR. MALLORY: No.

DR. HOLMES: Anything in the lungs?

DR. MALLORY: There was atelectasis in the right lower lobe and also several small metastatic nodules.

DR. BERNARD M. JACOBSON: There are in the literature several cases of pernicious anemia with diffuse pancreatic disease, usually chronic pancreatitis with fibrosis.

DR. MALLORY: In this case the head of the pancreas was quite normal, but the body and tail were entirely replaced by carcinoma.

DR. RICHARDSON: I wonder if it is fair to call this pernicious anemia on the basis of the finding of a few megaloblasts in the bone marrow. I have an idea that what we often refer to as a myelophthisic anemia is not in fact due to actual crowding of the bone marrow by tumor cells. We have seen patients with widespread malignant disease who showed a leukemoid picture and it is, of course, common to get an anemia with much evidence of marrow activity as shown by the presence of nucleated red blood cells in all stages of maturity. In this case I wonder whether there may not have been malignant disease in some parts of the marrow not examined pathologically which brought about such a regenerative blood picture, and if the jaundice in this case might not have been due to the extensive malignant involvement of the liver. Such a picture superficially resembles a hemolytic anemia.

DR. MALLORY I must confess to almost complete ignorance of the bone-marrow picture in patients with macrocytic anemia dependent on hepatic insufficiency. I have made no personal study of it and I have seen few reports in the literature. Wintrobe and Shumacker\* mention the bone marrow in two cases which came to autopsy in one it was reported merely as moderately hyperplastic, in the other as normal. I have, therefore, assumed it would not be readily confusable with that of pernicious anemia, but my evidence is scant.

As regards myelophthasic anemia we have felt that the major part of the bone marrow must be

diffusely replaced by tumor before it develops and therefore one could hardly miss it at autopsy if three or more flat bones were sampled. Moreover, such cases when the anemia is severe almost always show extramedullary hematopoiesis in the liver and the spleen as a further check upon one's diagnosis. In fact we have raised the hypothesis that this extramedullary red cell formation might well be responsible for one of the most important clinical indications of myelophthasic anemia in the presence of nucleated red cells in the blood smear even without profound anemia. It is easy to imagine that nucleated cells could slip more easily out of the sinusoids of soft and mobile organs like the liver and the spleen than from sinuses of the bone marrow with their bony encasement.

Wintrobe, M. M. and Shumacker, H. S. Jr. The occurrence of macrocytic anemia in association with disorder of the liver together with consideration of relation of this anemia to pernicious anemia. *Bull. Johns Hopkins Hosp.* 32:387-407 1933.

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## SEVENTIETH ANNIVERSARY OF THE CHILDREN'S HOSPITAL

ON June 8, 9, and 10, the Children's Hospital is celebrating the seventieth anniversary of its founding and the fiftieth anniversary of its nurses' training school. Graduates of the hospital have returned from all parts of the United States. The scientific program, which may be found in detail on another page of this issue of the *Journal*, is being presented by representative graduates of the departments of medicine, surgery, orthopedic surgery and pathology. A scientific exhibit by the present members of the hospital staff is now on view at the hospital.

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The nurses' training school is widely known. Its graduates hold many teaching and administrative



positions. Most of the teaching of pediatrics at the Harvard Medical School is carried on at the Children's Hospital. The interns and resident physicians of the hospital have come from and gone to all parts of this country and many foreign countries. The contributions of the staff of the hospital to medical literature are read throughout the world.

Thus the Children's Hospital not only provides good medical care for the sick of today but also contributes to the provision of better medical care for the sick of tomorrow.

### ACTA MEDICA URSS

Physicians and medical libraries in the United States will welcome the new international journal of medicine, founded by the young commissar of public health, Nicolai Ivanovitch Propper-Grachtchenkoff,\* entitled *Acta medica URSS*. The first two numbers have already appeared, and the papers form a noteworthy collection dealing with many spheres of medical thought and embracing both experimental and clinical medicine.

The new public-health commissar was head of the department of sensory physiology in the All-Union Institute of Experimental Medicine at Moscow before he assumed the heavy duties of directing the public health of the Soviet Union. Dr. Propper is well known in this country since his sojourn as fellow of the Institute of Experimental Medicine, Moscow, in 1936-37, when he carried out studies at the Rockefeller Institute for Medical Research in New York City and at the Laboratory of Physiology at Yale University. The first paper of the first number of *Acta medica URSS* is by Dr. Propper and deals with the role of medical science in the practice of public health, the paper displays a wide knowledge of world medicine, which is rare among Soviet writers. He states that one of the objects of this new journal is to make physicians of the Soviet Union cognizant

of progress in world medicine and that he hopes it will also promote a free interchange of ideas between the physicians of Russia and those in other countries of the world. There is no trace of chauvinism in Dr. Propper's writing and one trusts that the new journal which he and Dr. M. Serejski, the editor, have launched will have the enthusiastic reception which it so richly deserves both in their own country and abroad.

In the prefatory note it is stated that the editorial offices will receive papers in four international languages, Russian, French, English and German. The journal accepts original contributions, and it also reprints papers of importance culled from medical journals elsewhere in the world.

It may interest readers of the *Journal* to learn that the new public-health commissar is doing much to arouse interest in the history of medicine in Soviet Russia. He has already issued a Russian translation of Harvey's *De Motu Cordis* (1628), Galvani's *De Viribus et Electricitatis in Motu Musculari* (1791) and Trembley's celebrated monograph on the Hydra (1744). Other important reprints and facsimiles will be issued by the Commissariat of Public Health at Moscow in the near future. Russian editions of our great medical classics give interest and zest to bibliographers and collectors in the field of medical history, and we hope that Dr. Propper may long continue to promote in his own country the finer cultural and scientific traditions of the art.

### MASSACHUSETTS MEDICAL SOCIETY

#### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

#### BLEEDING IN THE PUERPERIUM

Mrs. R. L., a twenty-year-old gravida I, began to flow very freely on November 26, 1938, five days after a normal, full term delivery.

The family history was negative. The patient had had measles as a child. Her tonsils had been

In physiological literature the commissar is known as N. I. Propper, the compound cognomen "Propper-Grachtchenkoff" being used only in Russia. Dr. Propper's more important recent papers are as follows: "Sensitization by injury of the cutaneous nerve endings in the frog." *J. Fa. nol.* 85: 358-400, 1937 (with Francis Echlin). "Sensory fibres in the facial accessory nerve." *Ibid.* 92: 160-166, 1938. "Nature neuro-humoral de l'épilepsie." *Rev. neurol.* 70: 332-345, 1938. "Nature physiologique de la douleur." *Acta med. URSS* 1: 113-125, 1938.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

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City Hospital and was on the staffs of the Charlesgate Hospital, the Phillips House and many other Boston hospitals. At the time of his death Dr Thorndike was clinical professor of genitourinary surgery, emeritus, at Harvard Medical School.

Dr Thorndike was a member of the Massachusetts Medical Society, the American Medical Association, the American Association of Genito-Urinary Surgeons, and the Boston Surgical Club.

A son, Dr William T S Thorndike, and two daughters survive him.

**TIBBETTS**—GUY D TIBBETTS, M.D., of Antrim, New Hampshire, died June 2. He was in his fifty-second year.

Born in Gloucester he attended schools there and received his degree from Tufts College Medical School in 1911. He served his internship at the Boston City, the Boston State and the Cambridge City hospitals, and then started private practice in Bennington, New Hampshire. Dr Tibbetts was one of one thousand American doctors loaned to the British Government during the World War, and was awarded the Distinguished Service Cross by King George V.

He was a former member of the Massachusetts Medical Society, resigning in 1921 to join the New Hampshire Medical Society, and was also a fellow of the American Medical Association.

His widow survives him.

## MISCELLANY

### MANHATTAN CONVALESCENT SERUM LABORATORY

The New York Department of Health announces that that Manhattan Convalescent Serum Laboratory, a non-profit organization, is prepared to supply measles convalescent serum to hospitals and physicians at the cost of production. The serum is furnished at the rate of 50 cents per cubic centimeter, or \$2.50 for 5 cc.

Serum can be obtained at the Manhattan Convalescent Serum Laboratory, Room 610, in the William Hallock Park Laboratory of the New York City Department of Health, 15th Street and East River, between the hours of 9 a m and 5 p m. on all weekdays except Saturday when the laboratory is open from 9 a m to 12 noon. At all other times serum can be obtained from Dr William L. Wheeler, Jr., 348 West 22nd Street (Chelsea 3-4149).

Further information regarding convalescent serum supplied by the laboratory can be obtained from Dr William Thalheimer, director.

## NOTES

The following promotions on the faculty and teaching staff of Harvard Medical School, effective next September were recently announced.

Oliver Cope, Francis C Newton, Stanley J G Nowak and Robert Zollinger, assistant professors of surgery, Otto A. Bessey, associate in biological chemistry, Laurence B Ellis and Maurice B Strauss, associates in medicine, George M Hass, associate in pathology, John A V Davies, Lewis W Hill and Clement A. Smith, associates in pediatrics, Henry K Beecher, associate in anesthesia, Robert E Gross, John D Stewart and Carl W Walter, associates in surgery, and Henry D Chadwick, lecturer on medicine.

## REPORTS OF MEETINGS

### HOSPITAL DAY AT THE BEVERLY HOSPITAL

The annual observation of Hospital Day was held at the Beverly Hospital on Saturday, May 13, in accordance with the custom of having the celebration on the nearest Saturday to National Hospital Day. On this day the former interns are invited to return and spend the day as guests of the staff of the hospital.

The program as presented by the staff was initiated with a surgical clinic, the first case being a partial gastric resection, and the second an exploratory laparotomy for carcinoma of the gall bladder. The operations were performed by Drs Peer P Johnson and Richard E Alt. The following papers were then presented: Highlights in the Development of Modern Chemotherapy with Special Reference to Sulfapyridine, Dr Barnard Todd, Technique of Nailing a Fractured Hip (Beverly Hospital Method), a motion picture, Drs Johnson and Alt, presentation of cases by the house staff (Drs DeWolfe, Epstein, Commette and Todd) with discussions by Drs A E Parkhurst, Johnson, Paul E Tynnan and C F Branch.

### NEW ENGLAND SOCIETY OF PSYCHIATRY

The New England Society of Psychiatry held its sixty-fourth annual meeting at the Metropolitan State Hospital, Waltham, April 25, as the guests of Superintendent Roy D Halloran. The meeting was attended by one hundred and sixty-nine members and guests.

Following inspection of the hospital and an excellent luncheon, the meeting was called to order by President Harlan L. Paine. A few words of welcome by Superintendent Halloran opened the meeting. The minutes of the previous meeting were read and adopted. The report of the treasurer and auditors was submitted and adopted as presented. The following were elected to full membership: Dr Paul R. Felt, Middletown, Connecticut, Dr Valerie R. Jurecek, Howard, Rhode Island, Dr Adrian Scolten, Portland, Maine, Dr George L. Wadsworth, Middletown, Connecticut.

The Examining Committee for the best papers published during the calendar year of 1938 recommended that the awards be given to the writers of the three following papers: The Effect of Adrenalin and Mecholyl in States of Anxiety in Psychoneurotic Patients by Erich Lindemann and Jacob E. Finesinger, Pick's Disease: A specific type of dementia by Ira C. Nichols and Walter C. Weigner, Studies in Convulsant Therapy: 1. Technique and Clinical Phenomena. 2. The Role of Alkalinization by Stanley Rochelle Dean.

The following were elected to office: president, Dr Charles H. Dolloff, Concord, New Hampshire; vice president, Dr Roy D. Halloran, Waltham, Massachusetts; secretary-treasurer, Dr George A. Elliott, Middletown, Connecticut; counselors, Dr George E. McPherson, Belchertown, Massachusetts, and Dr Harlan L. Paine, North Grafton, Massachusetts.

The meeting adjourned following the reading of the paper, Some Observations on Patients Diagnosed as Having Schizophrenia, by Dr John W. Thompson, of the Harvard Fatigue Laboratory and the research staff of the Metropolitan State Hospital, and Dr William Corwin, of the Metropolitan State Hospital.

removed, as well as a cervical polyp. Catamenia began at fifteen and were regular with a twenty-eight-day cycle. The last period was February 16, making her due for delivery from November 23 to November 26. Her pregnancy had been uneventful. The delivery was normal and it was felt that the placenta was intact.

Convalescence after delivery was uneventful until November 26 at 10 a. m. when the hospital telephoned that she was flowing a great deal and had passed several large clots. She was given Ergoklonin, but since the flowing did not cease and it was estimated that she had lost about 500 cc of blood, it seemed wise to explore the uterus. The patient was typed and matched for possible transfusion. Her husband was found to be a compatible donor.

Under gas-oxygen anesthesia and strict asepsis, examination showed the uterus in good anterior position, well contracted and not much larger than a normal uterus five days post partum. The internal os admitted one finger. A definite piece of placenta was found adherent at the fundus and as much of this as possible was removed with the finger, dull curet and ovum forceps. An iodine pack was left in the uterus and was removed forty-eight hours later. After removal of the pack she passed a small clot and a piece of placental tissue. There was no flowing that night, but the next morning, November 29, she passed another clot which was mostly tissue. On December 1 she passed still another piece of tissue to which a good-sized clot adhered. Her pulse was under 70 and since her blood pressure had, at no time, gone below 110-120 systolic she was left alone. There was no bleeding after the expulsion of the clot on December 1, and she was discharged on December 11.

There was no abnormal flowing at the time of her first period after the birth of the baby.

DATE	RED-BLOOD CELL COUNT	HEMOGLOBIN
1938		%
Nov. 22	4 600 000	90
26	4 400 000	86
27	4 200 000	82
28	4 200 000	80
29	3 700 000	75
30	3 000 000	65
Dec. 1	3 250 000	65
2	3 100 000	62
3	3 320 000	68
4	3 420 000	74
6	3 250 000	73
8	3 800 000	75
10	3 900 000	82

The pathological report of the pieces of placenta obtained at the time of operation was as follows: "Decidua-like cells, extensive necrosis and chronic inflammation, a few cells of trophoblastic type, but no definite chorionic villi."

*Comment* This is another illustration of the

commonest cause of bleeding in the puerperium. At the time of the delivery of the placenta it is clearly remembered that the placenta seemed intact. There was a great deal of blood lost at the time of the initial hemorrhage, and it is surprising that the blood picture does not bear this out. It is of course possible that the blood figures are incorrect. The convalescence after the removal of the piece of placenta was afebrile, but the blood examinations showed that there was considerable bleeding for several days after the pack had been removed. A second invasion of the uterus was contemplated, but the patient's general condition led one to conservatism. No transfusion was done because the blood examination ruled out its necessity.

It is often observed that the first catamenia after delivery may be very free. This is true more frequently in patients who are not nursing. One may expect a very free period in one who has bled as this patient did, but, fortunately, her first period was normal in every respect.

The strictest asepsis must be observed in all cases requiring intrauterine treatment. One can not emphasize this too much and must also appreciate that, if a curet is used, it must be used with extreme care and never in a rough manner.

## DEATHS

McKEOUGH — WILFRED A. McKEOUGH, M.D., of Haverhill, died May 26. He was in his forty-eighth year.

Born in Nova Scotia, he received his degree from the Tufts College Medical School in 1924. He was assistant to Dr. Francis E. O'Brien, superintendent of the Hampshire County Sanatorium, at the time of his death and had formerly been assistant medical officer at the State Sanatorium, Glencliff, New Hampshire.

Dr. McKeough was a member of the Massachusetts Medical Society and the American Medical Association. Three sisters survive him.

PARTRIDGE — CHARLES C. PARTRIDGE, M.D., of Melrose, died May 29. He was in his eighty-first year.

Dr. Partridge was a former member of the staff of the Boston City Hospital and practiced for many years in Hyde Park.

He was a former member of the Massachusetts Medical Society.

His daughter, and three sons survive him.

THORNDIKE — PAUL THORNDIKE, M.D., of West Roxbury, died May 28. He was in his seventy-seventh year.

Born in Beverly, he attended the public schools in Milwaukee, Wisconsin, and graduated from Harvard College in 1884. He received his degree from the Harvard Medical School in 1888, and became a member of the staff of the Boston City Hospital the same year. He continued his studies in Vienna and upon his return joined the Harvard faculty as assistant professor of genitourinary surgery. He later became surgeon-in-chief at the Boston

There will also be numerous exhibits from the departments of medicine, surgery, orthopedic surgery, photography, pathology, administration and roentgenology, the Harvard Infantile Paralysis Commission Clinic, and the School of Nursing

### SYMPOSIUM ON CARCINOMA OF THE TONGUE

A symposium on carcinoma of the tongue has been arranged by the staffs of the Massachusetts General, Collis P Huntington Memorial, Pondville and Palmer Memorial hospitals. A review of cases seen at each of these hospitals will be presented by Drs Roy E. Mabrey, Ira T Nathanson, Thomas J Anglem and Clifford C Franseen. Discussion will be opened by Dr Channing C Simmons

The meeting will be held on Tuesday, June 13, on the roof of the Palmer Memorial Hospital, at 8 00 p m Refreshments will be served.

All members of the medical profession are cordially invited to attend.

LELAND S MCKITTRICK, M.D., *Chairman*

### LAWRENCE CANCER CLINIC

The regular Lawrence Cancer Clinic, to be held at the Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, June 20, at 10 00 a. m., will be a demonstration and teaching clinic for physicians, with Dr Channing C. Simmons, of Boston, present as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society

J FORREST BURNHAM, M.D., *Chairman*

### GRADUATE FORTNIGHT OF THE NEW YORK ACADEMY OF MEDICINE

The twelfth annual Graduate Fortnight of the New York Academy of Medicine will be held in New York City from October 23 through November 3. The general topic is 'The Endocrine Glands and Their Disorders'

As usual the clinical sessions will be held during the day at the various hospitals. During the evening, talks on different aspects of the general topic will be given at the Academy by men who are experts along such lines. The subtopics to be discussed are as follows: 'Historical Sketch of the Development of Endocrinology,' 'Physiology of Anterior Lobe of Pituitary Gland,' 'Pituitary Hypothalamic Syndromes,' 'Hypo- and Hyperpituitarism,' 'Therapeutic Application of Female Sex Hormones,' 'Physiology and Principal Interrelations of the Thyroid,' 'Hypothyroidism,' 'Hyperthyroidism,' 'Surgical Treatment of Hyperthyroidism and Other Diseases of the Thyroid,' 'The Adrenal Medulla,' 'Adrenal Insufficiency,' 'The Adrenal Cortex,' 'The Cushing Syndrome Neoplasms of the adrenal gland,' 'Overfunction of the Adrenal Cortex,' 'Relation of Diabetes to the Endocrine System,' 'The Influence of the Central Nervous System Upon Endocrine Activity,' 'Physiology and Pathology of Parathyroids,' 'Hyperparathyroidism,' 'Physiology of the Ovaries,' 'Physiology of Testes and Therapeutic Ap-

plication of Male Sex Hormones,' 'Puberty, Menstruation and Pregnancy' and 'Menopause.' A comprehensive exhibit of research, roentgenographic and pathologic material will be assembled to include diagnosis and treatment, clinical and laboratory diagnostic methods, action of drugs and other therapeutic measures. The library will exhibit books relating to the subject.

Registration fee for non-members is five dollars. Further details may be obtained by writing to the New York Academy of Medicine, 2 East 103 Street, New York City

### SOCIETY MEETINGS AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 12

##### MONDAY JUNE 12

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health 55 Shattuck Street Boston

##### TUESDAY JUNE 13

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health, 55 Shattuck Street Boston

\*10 a. m. 12 30 p. m. Tumor Clinic Boston Dispensary

\*8 p. m. Symposium on Carcinoma of the Tongue. Palmer Memorial Hospital

##### WEDNESDAY JUNE 14

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health 55 Shattuck Street Boston

##### THURSDAY JUNE 15

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health 55 Shattuck Street, Boston

##### FRIDAY JUNE 16

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health 55 Shattuck Street Boston.

\*10 a. m. 12 30 p. m. Tumor Clinic Boston Dispensary

##### SATURDAY JUNE 17

Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Harvard School of Public Health 55 Shattuck Street Boston.

Because of the holiday the usual staff rounds at the Peter Bent Brigham Hospital conducted by Dr Henry A. Christian will be omitted.

Open to the medical profession

JUNE 9 and 10—Seventieth Anniversary of the Children's Hospital. Page 976

JUNE 12 16—Catholic Hospital Association. The Milwaukee Auditorium Milwaukee Wisconsin

JUNE 12 17—Symposium on the Public Health Significance of the Virus and Rickettsial Diseases. Page 815 issue of May 11

JUNE 13—Symposium on Carcinoma of the Tongue. Page 941 issue of June 1

JUNE 20—Lawrence Cancer Clinic. Notice above.

JUNE 26-29—National Tuberculosis Association. Page 897 issue of May 25

JUNE 27 29—Medical Library Association. Page 941 issue of June 1

JUNE 29—Pentucket Association of Physicians, 8 30 p. m. Hotel Whittier 5 Washington Street Haverhill

SEPTEMBER 30 SEPTEMBER 2—Seminar in Physical Therapy. Page 857 issue of May 18

SEPTEMBER—Boston Psychoanalytic Institute. Page 450 issue of September 22

SEPTEMBER 4-6—Institute for the Consideration of the Blood and Blood Forming Organs. Page 941 issue of June 1

SEPTEMBER 5-8—American Congress of Physical Therapy. Page 857 issue of May 18

SEPTEMBER 11 15—American Congress on Obstetrics and Gynecology. Page 938 issue of December 8

SEPTEMBER 14-16—Biological Photographic Association. Page 941 issue of June 1

SEPTEMBER 15-28—Pan-Pacific Surgical Association. Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3—New York Academy of Medicine. Notice above.

FALL, 1939—Temperature Symposium. Page 218 issue of February 2.

MAY 14 1940—Pharmacopoeial Convention. Page 894 issue of May 25

### DISTRICT MEDICAL SOCIETY

#### NORFOLK SOUTH

JUNE 14—Page 697 issue of May 25

## NOTICES

BOSTON DOCTORS  
SYMPHONY ORCHESTRA

The Boston Doctors' Symphony Orchestra cordially invites the medical profession to tune in on Station WEEI Sunday evening, June 11, at 8 o'clock to hear its first family concert.

*Nieder Slomowsky*

SEVENTIETH ANNIVERSARY  
OF THE CHILDREN'S HOSPITAL

The seventieth anniversary celebration of the Children's Hospital will be held in Vanderbilt Hall, Friday and Saturday, June 9 and 10

## MEDICAL PROGRAM

Friday, June 9

- 8 00 a. m.—9 45 a. m. Selected operations by surgical and orthopedic services
- 9 45 a. m. First scientific session Dr W E. Ladd, chief of the Department of Surgery and clinical professor of surgery, Harvard Medical School  
Opening remarks Dr Ladd.  
Words of welcome. Dr Paul Emerson, president of the Children's Hospital Alumni Association  
Remarks and announcements Dr P J Mahoney, secretary of the Children's Hospital Alumni Association  
The Children's Hospital Today Dr Sidney Farber, secretary of the visiting staff of the Children's Hospital.
- 10 15 a. m.—12 30 p. m. Certain Aspects of the Protein Metabolism of Premature Infants Dr S Z. Levine, professor of pediatrics, Cornell University Medical College.  
Correlation of the X-ray and Autopsy Findings in Lipoid Pneumonia Dr R. S. Bromer, assistant professor of radiology, Graduate School of Medicine, University of Pennsylvania  
Some Studies of Body Water in Normal and Abnormal Growth Dr Bengt Hamilton, associate professor of pediatrics, University of Illinois  
Studies on the Blood Level of Co-Enzyme I (Cozymase) in Nicotinic Acid. Dr S O Dexter, Jr, The Rockefeller Institute Hospital  
The Bridle of Theages Dr J A Nutter, clinical professor of orthopedic surgery, McGill University  
Intra mesenteric Diverticula. Dr J W Duckett, associate professor of clinical surgery, Baylor University  
Children's Surgery as a Specialty Dr H. C. Coe, Seattle, Washington

Training Crippled Children Dr J F Pohl (Talk and moving pictures)

1 45 p. m.—4 15 p. m. Second scientific session Chairman Dr F R. Ober, chief of Department of Orthopedic Surgery, and professor of orthopedic surgery, Harvard Medical School.

The Calcium Balance in a Case of Legg's Disease. Dr J A Johnston, pediatrician-in-chief, Henry Ford Hospital, Detroit, Michigan

Hypoproteinemia Dr A. A. Weech, associate professor of pediatrics, Columbia University Medical School, the Babies' Hospital.

Membrane Formation at Lipoid Protoplasmic Interfaces Dr G M Hass, instructor in pathology, Harvard Medical School.

Human Locomotion A summary of twelve years of research Dr R P Schwartz, associate professor of surgery, University of Rochester

Acute Appendicitis in Childhood. Dr Henry Hudson, Jr, assistant in surgery, Harvard Medical School

On the Acid-Soluble Phosphorus Compounds of Red Blood Cells Dr G M. Guest, associate professor of pediatrics, University of Cincinnati, College of Medicine

Coronary Artery Occlusions Dr Monroe Schlesinger, Jr, Associate in pathology, Harvard Medical School, pathologist to the Beth Israel Hospital.

Saturday, June 10

- 8 00 a. m.—9 45 a. m. Selected operations by surgical and orthopedic services
- 9 45 a. m.—12 00 m. Third scientific session Chairman, Dr S Burt Wolbach, chief of the Department of Pathology and Shattuck Professor of Pathology, Harvard Medical School.  
Photometry and Vitamin A. Dr P C Jeans, professor of pediatrics, University of Iowa  
New Shelf Operation for Subluxation of the Hip-Joint. Dr E. W. Ryerson, senior orthopedic surgeon, St. Luke's Hospital, Chicago, and formerly professor of orthopedic surgery, Northwestern University Medical School.  
Hydrometrocolpos in Infancy Drs J W Chamberlain and P J Mahoney, Boston University School of Medicine.  
Studies in the Physiology of Premature Infants Dr J L. Wilson, associate professor of pediatrics, Wayne University College of Medicine, Detroit, Michigan  
The Care of Prematures Isabelle Jordan, R N, assistant superintendent of nurses, the Children's Hospital, Boston (Moving picture.)  
Surgical Management of the Patent Ductus Arteriosus With summary of four successfully treated cases. Dr R. E. Gross, instructor in surgery, Harvard Medical School  
Metabolism of Sulfanilamide. Dr J S Harris, associate in pediatrics, Duke University Medical School
- 12 00 m.—1 00 p. m. Clinicopathological conference conducted by the chiefs of the four services pediatrics, surgery, orthopedic surgery and pathology
- 1 00 p. m. Closing remarks by Dr K. D. Blackfan, chief of the Department of Pediatrics and Thomas Morgan Rotch Professor of Pediatrics, Harvard Medical School

# The New England Journal of Medicine

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## PYELITIS, URETERITIS AND CYSTITIS CYSTICA\*

FRANK S. PATCH, MD†

MONTREAL

**P**YELITIS, ureteritis and cystitis cystica constitute definite pathologic conditions in which cysts are formed in the mucosa or submucosa of the renal pelvis, ureter and bladder respectively.

The first mention of such a condition was made by Morgagni in 1761. Since then it has been described by many pathologists. Litten in 1876 made the first microscopic study. He believed that the cysts resulted from the proliferation of mucous membrane, forming mucosal cysts, or that they were derived from pre-formed glands. Subsequent writers, including Osler, suggested a parasitic origin from coccidial infection. Today the hypothesis advanced by von Limbeck in 1887 and von Brunn in 1893 is generally accepted by most authorities. These authors ascribed the genesis of the cysts to the downward projection, from the inferior layer of the epithelial cells of the mucosa, of epithelial nests, now known as Limbeck-Brunn nests, though more commonly as Brunn's nests. Subsequently, a lumen is developed in the center of the nest by a degenerative or what is more probable a secretory process. At this point the condition may evolve in two directions: first, to the formation of cysts with distended lumina, lined with flattened epithelium, pyelitis, ureteritis or cystitis cystica; second, by a further development of the secretory process, so well described by Stoerk and Zuckermandl. While the lumen in the epithelial cell nests is still small, the surrounding cells assume a concentric radiating position about it. The inner layer takes on definite characteristics of secreting epithelium, with basally placed nuclei. The inner portion of the cells becomes light, and in it are seen granules which stain with a mucin stain. In other words, the epithelial cells have taken on the characteristics of a secreting epithelium, with the production of true

mucin‡. The resulting condition is known as pyelitis, ureteritis or cystitis glandularis. The cystic and glandular forms are thus very closely related, both resulting from a metaplasia in the epithelium of the urinary tract.

This view of the development of cystitis glandularis has not had universal acceptance. It has been challenged notably by François, who championed the theory that it results from the embryonal inclusion of germinal cells of the lower intestinal tract. This would seem very difficult to combat in the case of the exstrophied bladder, where cystitis cystica and glandularis are found extremely well developed. Their occurrence in the renal pelvis is not so easily explained. The studies of Enderlen and Formiggini, however, would appear to be conclusive. They discovered quite independently that the exstrophied bladders of newborn infants revealed no signs of any cystic or glandular formation. In other words, cystitis cystica and glandularis are postnatal acquisitions.

From a clinical point of view, there is nothing very characteristic of these conditions, apart from a constriction of the ureter, which may follow the ureteral variety. Usually they are quite overshadowed by the underlying condition responsible for the inflammation, of which they are merely a part.

The changes mentioned are not the result of a special form of inflammation but are rather the result of alterations in the bladder epithelium which may develop in the course of any long-continued, not too intense inflammation. While the inciting cause may be found in any kind of chronic irritation, it would appear that the conditions of which we are speaking develop most commonly in the presence of certain special irritating factors. Stone is a frequent concomitant. Inflammatory exudates from infected kidneys may

‡It should be pointed out that the mucus-like material which is found in the urine of infected bladders is not a true mucin, but a pseudomucin composed of nucleoproteins derived from degenerating leukocytes.

Read at a meeting of the New England Branch of the American Urological Association, Boston, November 17, 1938.  
From the Departments of Urology and Pathology, Montreal General Hospital, Montreal.

†Professor of urology and head of the Department of Surgery, McGill University Faculty of Medicine, urologist, Montreal General Hospital.

## BOOKS RECEIVED FOR REVIEW

*Clinical Pathological Gynecology* J Thornwell Witherspoon 400 pp Philadelphia Lea & Febiger, 1939 \$6.50

*The Physiology and Pharmacology of the Pituitary Body* H B Van Dyke. Vol 2 402 pp Chicago The University of Chicago Press, 1939 \$4.50

*What it Means to Be a Doctor* Dwight Anderson 87 pp New York Public Relations Bureau, Medical Society of the State of New York, 1939 \$1.00

*The Patient as a Person A study of the social aspects of illness* G Canby Robinson. 423 pp New York The Commonwealth Fund, 1939 \$3.00

*Crystalline Enzymes The chemistry of pepsin, trypsin, and bacteriophage* John H Northrop 176 pp New York Columbia University Press, 1939 \$3.00

*L'Année Thérapeutique Médications et procédés nouveaux* A Ravina 188 pp Paris Masson et Cie, 1939 25 Fr fr

*The Medical Press and Circular 1839-1939 A hundred years in the life of a medical journal* Robert J Rowlette. 127 pp London Medical Press and Circular, 1939 10s 6d.

*A Textbook of Clinical Neurology with an Introduction to the History of Neurology* Israel S Wechsler Fourth edition, revised 844 pp Philadelphia and London W B Saunders Co, 1939 \$7.00

*Menstrual Disorders Pathology diagnosis and treatment* C Frederic Fluhmann. 329 pp Philadelphia and London W B Saunders Co, 1939 \$5.00

*Endocrinology in Modern Practice* William Wolf Second edition, completely revised 1077 pp Philadelphia and London W B Saunders Co, 1939 \$10.00

*Medical Jurisprudence and Toxicology* William D McNally 386 pp Philadelphia and London W B Saunders Co, 1939 \$3.75

*Health Officers Manual General information regarding the administrative and technical problems of the health officer* J C Geiger 148 pp Philadelphia and London W B Saunders Co, 1939 \$1.50

*Heart Patients Their study and care* S Calvin Smith 166 pp Philadelphia Lea & Febiger, 1939 \$2.00

*Laboratory Manual of the Massachusetts General Hospital* Francis T Hunter Third edition, thoroughly revised 119 pp Philadelphia Lea & Febiger, 1939 \$1.75

## BOOK REVIEWS

*Roentgen Diagnosis of the Extremities and Spine* Albert B Ferguson 435 pp New York Paul B Hoeber, Inc., 1939 \$12.00

From the Roentgenological Department of the New York Orthopaedic Hospital, under the authorship of its director, Dr A B Ferguson, comes this valuable study of roentgen ray technic and an interpretative discussion of the uses of the roentgen rays in the diagnosis of lesions in the spine and extremities. The keynotes of the study are the author's methods of analysis of the effects of trauma and disease on the various tissues involved in the osseous framework of the body how these tissues react to inflammatory processes within or external to the bone, the distinctions that should be made between atrophy and decalcification, between cortical thickening and hypertrophy and between the different types of osseous density, that is, those caused by pyogenic agencies and syphilis or tuberculosis, and the characteristics that should enable one to distinguish a fracture line from congenital osseous defects that occur in the various bones of the body and the

ways of distinguishing between calcification and ossification, all of which observations are helpful in differentiating pyogenic lesions from tumors, and so forth

Calcifications occurring post traumatically, after periosteal rupture and in the walls of bursas, also come in for discussion. In Chapter 3 is a consideration of decalcification, loss of structure and loss of substance, and how these defects are associated with the anemias, malacias, old age atrophies, atrophies of disuse, Kümmell's disease, and so forth. In Chapter 4 the significance of soft tissue swellings as indicative of already visible, nearby, osseous lesions, or such lesions not yet roentgenologically detectable but soon to appear, is discussed. Chapter 5 defines the pathognomonic indications of malignancy in diaphyseal bone, and in the following chapter the features that distinguish abnormalities of metaphyseal bone are considered, these peculiar features being due to the nature of the capillary circulation in the metaphysis and the fact that it is there that changes due to growth in bone take place. A chapter on the inherent disturbances of bone formation includes the chondrodystrophies, chondrodysplasias, achondroplasias, ostitis fibrosa, and so forth. The chapters on fractures and their healing contain much information in respect to the phases of callus formation and other matters of interest to those who deal with fracture repair. The development of the epiphyses and the occurrence of anomalous small-bone masses in various locations have a chapter devoted to their description. The final sections concern non-osseous tissues, — such as loose bodies in or about joints, — Charcot's disease and other degenerative lesions, bursal effusions, the arthritides, tuberculous and non tuberculous lesions and lumbosacral anomalies.

The wealth of material on which the author could draw and the admirable reproduction of his more than 500 illustrations, supplemented, as these are, by 262 brief case histories from the hospital records, make this volume a most helpful guide to roentgen diagnosis

*Health at Fifty* Edited by William H. Robey 299 pp Cambridge Harvard University Press, 1939 \$3.00

Among the agencies operating to promote the health of the people, the free public lectures delivered in Boston by the faculty of the Harvard Medical School hold high rank. Since the quality of these addresses warrants the widest possible distribution, twelve have been included in the book under the above-designated title.

In addition to the importance of having individuals know about the causes and effects of the commoner fatal and disabling diseases, a general appreciation of the economic and sociologic implications of them will bring about a more active co-operative spirit among intelligent and public spirited laymen, which will promote progress in the health programs underway by organized medicine.

The subjects dealt with by these eminent specialists are heart disease, cancer, blood pressure, overweight and underweight, rheumatism, menstruation and the menopause, care of the eyes, vitamins, glands of internal secretion, the family medicine cabinet, mental health and the problems of old age. The writers have avoided the use of technical terms and have shown marked ability in presenting facts in an interesting and instructive manner. This volume should be in all circulating libraries, for the people who will profit most by reading it will not be among those who ordinarily frequent medical libraries.

Practitioners may well advise patients to read every chapter in the book during convalescent periods, when the mind is in a receptive mood. Other editions should follow this publication.



pathologist of the Jewish General Hospital, Montreal. It was found in a case of calculous pyonephrosis in which a few cysts were discovered in the

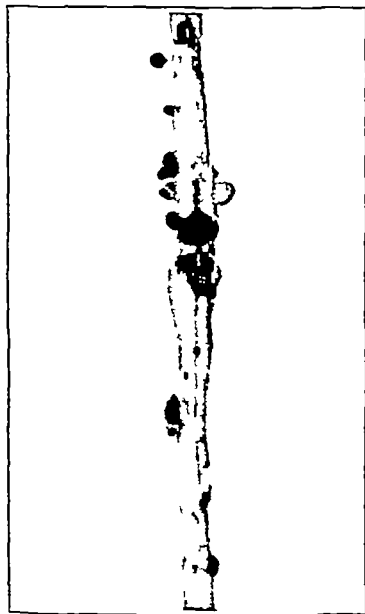


FIGURE 1

*Photograph of a postmortem specimen from a case of ureteritis cystica showing numerous thin walled cysts in the wall of the ureter*

pelvis and upper ureter. Evidently there had been a long-continued renal infection, associated with the calculi (Fig 2)

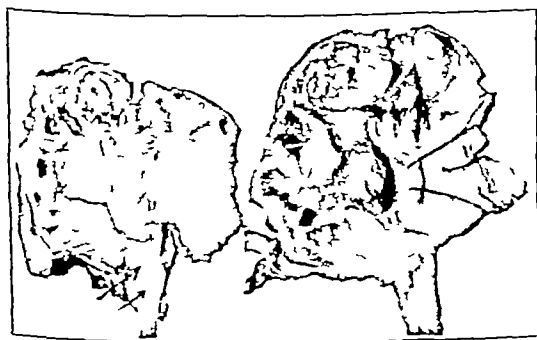


FIGURE 2

*Photograph of a postmortem specimen from a case of calculous pyonephrosis showing two cysts in the ureter and one cyst in the pelvis*

The main interest in this presentation is with cases in which a clinical diagnosis has been made. Only within the last decade has pyeloureteritis cystica been diagnosed clinically. From the literature I have been able to collect 8 cases, which are here briefly reviewed.

*Case 1* Jacoby in 1929 appears to have been the first to make a clinical diagnosis of ureteritis and pyelitis cystica. The patient was a 40-year-old man, who gave a history of chronic urinary infection of 20 years duration. Renal calculi were present in the left kidney. The bladder showed the typical picture of cystitis cystica. The pyelogram showed a cystic dilatation of the calices and mottled filling defects down the entire left ureter.

*Case 2* Joelson in 1929 reported a case in a woman of 44 who entered the hospital because of intermittent hematuria of 13 years duration. Calculi were present in both kidneys. Cystitis cystica was present. Ureteropyelography revealed dilated pelvis and ureters. Small filling defects were noted in the pelvis and marked ones in the ureters.

*Case 3* Kindall in 1933 confirmed his clinical diagnosis by operation and biopsy. A man of 41 entered the hospital with a right renal colic. He had passed a stone. There were no cysts in the bladder. A clinical diagnosis of pyeloureteritis cystica was confirmed by an exploratory operation. This is the first recorded case in which a clinical diagnosis was confirmed by operation and biopsy. The condition was treated by ureteral dilatation and instillation of 2 per cent silver nitrate solution. Clinical and pyelographic improvement followed.

*Case 4* Fite's case (1935) was also confirmed by operation. The patient, a woman of 41, had suffered from urinary frequency for many years, with a recent exacerbation of bladder pain and frequent and painful urination. There was a calculus in the right kidney. The bladder was normal. The ureter showed a moth-eaten appearance. Operation revealed a kidney pyonephrotic in its lower half, which was removed by heminephrectomy. A biopsy from the ureter was secured. The ureter was studded with small, tense, glistening cysts.

*Case 5* Chevassu (1936) reported a case of a woman of 51 with a history of pyuria for 26 years. The x-ray film showed a calculus in the right kidney. Ureteropyelograms showed characteristic mottlings. At the operation for the removal of the stone, a section of pelvis was removed for histological study. There were no cysts in the bladder.

*Cases 6, 7 and 8* In 1936, Hinman reported 3 cases. The first was a woman of 64, who entered the hospital complaining of severe right lumbar pain of 2 months duration, with transient attacks of hematuria, and with increased frequency of urination. Pyuria was noted. Cysts were seen in the bladder. Both ureters were dilated. Numerous non-opaque filling defects were observed in both ureters, particularly in their lower two thirds. At the upper ends of both ureters were noted large spherical dilatations, with marked ureteral constrictions immediately beneath. The calices were distended on both sides and there was marked constriction of the calculopelvic junctures. The pain and bladder symptoms improved after a course of ureteral dilatations and the instillation of a 1 per cent silver nitrate solution. The filling defects in the ureter disappeared, but the intra-pelvic changes were unaltered.

His second case was that of a man of 37, who gave a history of pain in the left renal area, with chills, fever, frequency, hematuria, burning and pyuria of 1 year's duration. Three months before admission he had a similar attack. There remained a constant aching pain in the left loin, with frequency, nocturia and burning micturition. Cystoscopy revealed a well-marked cystitis cystica. Both ureters were dilated and scattered filling defects

be the starting point. Mechanical influences alone may bring about the change. For instance, cystic and glandular formations have been found in the bladder in aseptic chronic urinary retention, secondary to prostatic adenoma. When mechanical influences are superadded to infection, they are seen in their most marked development, as in the mucosa of the exstrophied bladder. Chronic cystitis is nearly always present in both cystitis cystica and cystitis glandularis. Where it is not associated, it is presumed to have been present previously, even in intrauterine life.

The condition may develop with extraordinary rapidity. Stoerk and Zuckerkandl report a case of well-marked cystitis cystica and glandularis which developed in forty-two days. While these authors claim that the condition remains during the life of an individual, our own repeated clinical observations show that it may completely disappear. In one case of cystitis cystica, while the underlying infective condition was unchanged, disappearance of bladder cysts was noted, and in a case of cystitis cystica and cystitis glandularis their disappearance followed soon after the removal of the underlying etiologic factors, a ureterocele and a bladder calculus, by cystostomy and temporary bladder drainage.

The experimental work of Gianti is most illuminating. In carrying out studies on urinary tuberculosis, Gianti introduced capsules containing tubercle bacilli into the bladders of rabbits, by means of a suprapubic cystotomy. The capsules became encrusted and calcified, epithelial nests were formed about them and the typical pathologic picture of cystitis cystica developed. He also produced the condition by curettage of the mucosa. The condition disappeared in three or four months.

In a previous communication, I endeavored to show the relation between leukoplakia and squamous-celled carcinoma, and at a later date Dr Rhea and I dealt with the relation between cystitis glandularis and mucus-secreting adenocarcinoma of the bladder. In our studies since then we have found the exstrophied bladder a most fertile field of study. Here the two factors of mechanical irritation and inflammation have ample scope, and it is not surprising to discover the two processes of leukoplakia and cystitis cystica or glandularis richly developed side by side. Both conditions, we believe, represent two forms of metaplasia. Both are likely to undergo a further transformation or metamorphosis to carcinoma, squamous-celled in the one case, adeno-carcinoma in the other, the two types of cancer which are found most frequently in the exstrophied bladder, a viscus which is extremely prone to develop malignant changes.

According to Morse, who reviewed the subject in 1928, the literature contains reports of not more than 60 cases of pyelitis cystica, ureteritis cystica or cystitis cystica, mainly of pyelitis cystica and ureteritis cystica. Since that date there have been some additional reports, which, however, do not convince me that the condition is as rare as the paucity of reports would indicate. Certainly cystitis cystica is not a rare condition. Our own experience has shown us that isolated cysts are found not infrequently about the bladder neck, and that even a well-marked development is not unusual. Some years ago, a short study revealed 12 cases in which material obtained at operation or autopsy was available. Morse, in a study of 125 autopsies, practically consecutive, recognized 3 macroscopically as pyelitis cystica, ureteritis cystica or cystitis cystica, while cell nests, buds or cysts were found microscopically in 108 cases. During the cystoscopic examination of 190 cases, he found cystitis cystica in 33, or 17 per cent. MacKenzie and Beck in 1936, in 50 autopsies of women subjects, found 16 cases with epithelial nests at the bladder neck and 11 with cysts in the same area.

The finding of a well-marked development of pyelitis cystica and ureteritis cystica is much more unusual. To the 28 cases collected by Morse in 1928, Hinman has added 13, exclusive of the cases based on purely clinical diagnosis, which are dealt with below. Among these are those reported by Urquhart, who, in a series of autopsies in Egypt on patients infected with *Schistosomum haematobium*, found 6 cases of ureteritis cystica. All these cases were discovered at autopsy or operation. To them we shall add 2 cases coming under our own observation but discovered post mortem.

The first is a specimen preserved in the Pathological Museum of McGill University. To Dr C B Keenan of the Royal Victoria Hospital, Montreal, I am indebted for the privilege of reporting it.

A woman of eighty-four was admitted to the hospital with a fracture of the neck of the femur. Suffering from auricular fibrillation during her treatment, she developed two very large decubitus ulcers over her sacrum. She gradually failed, and died two months later. So far as can be learned, there was a history of long-continued urinary infection. Autopsy revealed among other conditions a necrotic cystitis. At one point the bladder had sloughed through into the peritoneal cavity and produced a generalized peritonitis from which the patient died. Pyemic abscesses were found in both kidneys. Both ureters were studded with small thin-walled cysts lined with flattened epithelium (Fig 1).

The second case is a postmortem specimen for which I am indebted to Dr D P Seecof, late

third, are seen several longitudinal filling defects, which are suggestive of a ureteritis cystica (Fig 4)

In this case, in view of the long history of chronic urinary infection, the presence of cystitis cystica, the dilated and strictured ureters and the filling defects in the left ureter, we have made a clinical diagnosis of ureteritis cystica, with a suspicion of pyelitis cystica. Ureteral dilatation, or the little we have been able to perform, seems to have been followed by some improvement.

**Case 10** A man of 71 was admitted to the medical service of the Montreal General Hospital in June, 1937, complaining among other things of a nocturia of 3 years duration. He had a chronic bronchitis and hypertensive cardiovascular disease. For the previous 3 years he had had frequency, by day every 2 hours, by night three to four times. In the 3 weeks previous to admission the symptoms had been greatly aggravated. He passed small quantities of urine every 30 minutes, and complained of burning and dribbling. For several days he had been unable to sleep on account of persistent suprapubic and groin pain. His prostate was moderately enlarged. The urine contained a moderate quantity of pus, 1 to 5 cells per high-power field. The frequency subsided somewhat after resting in bed.

As the routine x-ray films showed a shadow in the left kidney region, suggesting a calculus, the patient was seen by the Urological Service on June 10

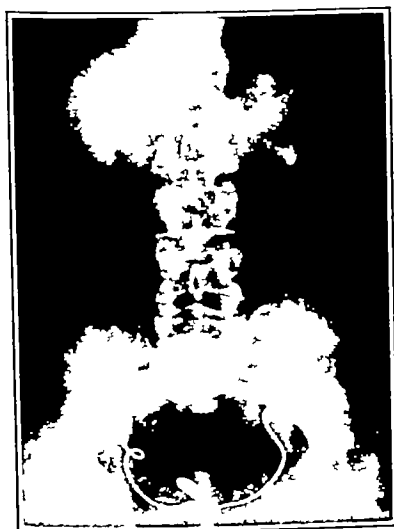


FIGURE 5 Case 10

*X-ray film showing a calculus in the left kidney*

Cystoscopy showed a slight prostatic enlargement. The ureters were catheterized, the right easily, the left with difficulty and only partially. No pus was found in the ureteral specimens. Pyelography showed the opaque shadow to be situated in the inferior calyx of the left kidney (Fig 5). This pelvis was incompletely filled. Multiple circular filling defects were observed on both ureters and the right kidney pelvis.

Four days later the patient was again cystoscoped. On this occasion, a more careful search of the bladder revealed the presence of two cysts at the bladder neck. Garceau catheters were passed up both ureters for 5 cm. Culture of the right kidney urine showed *Staphylococcus aureus*. That of the left side gave no growth. Pyelograms showed

clearly the presence of the filling defects in the left ureter and left pelvis (Fig 6)

The patient had a definite renal insufficiency, his urea concentration factor being only 22. On account of this, his age and his hypertensive cardiovascular condition, operation for the removal of the calculus was neither desired nor urged. Similarly, further ureteral dilatations were not possible.



FIGURE 6 Case 10

*Composite urogram. Note the filling defects in both ureters and kidney pelvises*

While operative confirmation was not secured, it is believed that this is a definite case of pyeloureterocystitis cystica.

#### SYMPTOMS

There are no symptoms pathognomonic of the condition, since they are found in patients suffering usually from long-standing urinary tract infections, and the symptoms are identical with those of such an infection or conditions such as calculus, so often associated. From this fact it happens that the condition is usually found in older individuals. That age is not an essential requisite is seen in the fact that the exstrophic bladder shows the condition in its most marked development. It occurs about equally in both sexes, though one would expect from the more numerous obstructive factors present in men that they would be more likely to suffer from it. Calculus is frequently found. Five of the 10 clinical cases of pyeloureteritis cystica had renal stone. Occasionally copious hematurias are reported. This symptom has not infrequently been responsible for a diagnosis of tumor. Only at the nephrectomy was the true condition revealed. There is a very definite tendency to bilaterality. The bacteriological flora is very variable, including *Staphylococcus*

were observed in the ureterogram. The right ureteropelvic junction was narrowed and there was a slight spherical dilatation of the pelvis at upper end of the ureter above it. The calculopelvic junctions on both sides were narrowed.

Harrison's third case was that of a woman of 35, who gave a history of burning, urgency and nocturia of 10 years' duration. Her kidney had been removed for nephroma 1 year after the first onset of symptoms. Cystoscopy revealed well-marked cystitis cystica. No filling defects were noted in the ureter. There was narrowing of the calculopelvic junctions, with dilatation of the calyces. There was slight narrowing of the ureteropelvic junction. In this case we diagnosed a pyelitis cystica, because of the presence of cystitis cystica and the pyelographic change in the pelvis which we believe to be characteristic of a pyelitis cystica.

To these 6 cases we add 2 others in which we have made a clinical diagnosis of pyeloureteritis cystica. Ten cases, therefore, have been diagnosed by urological study, though in 3 only, the cases of Kindall, Fite and Chervassu, was there confirmation by operation and biopsy. In these 3 cases the presence of calculus indicated operative interference.

Case 9. A farmer, a veteran of the World War, was first seen by us in 1926, then aged 29, complaining of urinary frequency and cloudy urine, present since his war

bladder infection was found matted with small transient cysts, most numerous on the floor and extending backward on the trigone. Both ureteral specimens showed 29 to 30 pus cells per high-power field. Both catheters were blocked by obstructions about 10 cm. up the ureter. X-ray under sodium iodide revealed dilated ureters below the point of obstruction (Fig. 3). No filling defects were seen.

It was not possible to do anything more for the patient at this time owing to his unwillingness to follow any treatment. He was in the hospital on several occasions in 1936 and 1937 for brief examinations. On three occa-



FIGURE 4 Case 9

Composite urogram taken after ureteral dilatation. Note the filling defects in the left lower and right upper ureters.

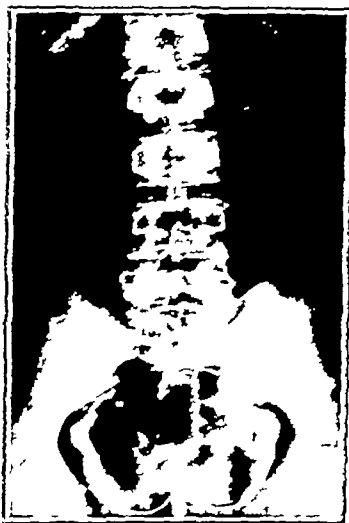


FIGURE 3 Case 9.

Ureterogram in which a clinical diagnosis of ureteritis cystica was made, taken before ureteral dilatation. Note the bilateral ureteral block and the suspicious filling defects in ureters.

service. The frequency was intensified after exposure to cold and fatigue. Occasional pains were felt in the region of the left kidney. At this time urological study was advised, but it was not carried out until 1931, when the patient was admitted to the Montreal General Hospital. There was slight tenderness in both costovertebral areas. The urine contained a moderate quantity of pus. There was frequent urinary frequency by day and two to six times at night. X-ray films showed no calculus. On cystoscopy the

long single attempts at ureteral dilatation were made, with some improvement, as on the patient's last visit in August, 1937, he stated that his frequency was better than it had been for many years. He suffered, however, from low back pain and fatigue on exertion, and the urine still contained pus. Urine culture revealed no bacterial growth. At cystoscopy, cysts were always found on the trigone and around the bladder neck. The lower ureters were still tortuous and dilated. Only in August, 1937, were we able to demonstrate any filling in a kidney, and that was the right one. Intravenous pyelograms were most unsatisfactory because of the poor visualization. The combined renal function was definitely impaired. The urea concentration factor on August 14, 1937, was only 33.

The cystoscopic report of August 14, 1937, reads as follows: "The internal orifice and trigone are covered with cysts. Several cysts are noted close to the ureteral orifices." Both kidney specimens contained pus. Pyelography on this occasion revealed the following: "The tip of the catheter on the right side has reached a level between the 4th and 5th lumbar vertebrae. On the left side the catheter has reached the level of the upper border of the 4th lumbar spine. The pelvis and calyces of the right kidney are filled. No injection on the left. There is slight dilatation of the pelvis of the right kidney, with rather irregular blunting of the upper calyx. Both ureters are tortuous and dilated. On the left ureter, in its lower

third, are seen several longitudinal filling defects, which are suggestive of a ureteritis cystica (Fig 4)

In this case, in view of the long history of chronic urinary infection, the presence of cystitis cystica, the dilated and strictured ureters and the filling defects in the left ureter, we have made a clinical diagnosis of ureteritis cystica, with a suspicion of pyelitis cystica. Ureteral dilatation, or the little we have been able to perform, seems to have been followed by some improvement.

**Case 10** A man of 71 was admitted to the medical service of the Montreal General Hospital in June, 1937, complaining among other things of a nocturia of 3 years duration. He had a chronic bronchitis and hypertensive cardiovascular disease. For the previous 3 years he had had frequency, by day every 2 hours, by night three to four times. In the 3 weeks previous to admission the symptoms had been greatly aggravated. He passed small quantities of urine every 30 minutes, and complained of burning and dribbling. For several days he had been unable to sleep on account of persistent suprapubic and groin pain. His prostate was moderately enlarged. The urine contained a moderate quantity of pus, 1 to 5 cells per high power field. The frequency subsided somewhat after resting in bed.

As the routine x-ray films showed a shadow in the left kidney region, suggesting a calculus, the patient was seen by the Urological Service on June 10

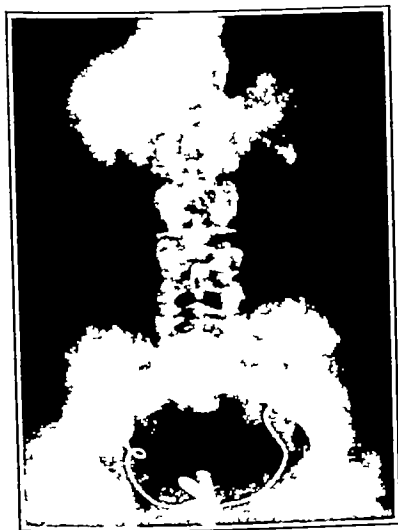


FIGURE 5 Case 10

*X-ray film showing a calculus in the left kidney*

Cystoscopy showed a slight prostatic enlargement. The ureters were catheterized, the right easily, the left with difficulty and only partially. No pus was found in the ureteral specimens. Pyelography showed the opaque shadow to be situated in the inferior calyx of the left kidney (Fig 5). This pelvis was incompletely filled. Multiple circular filling defects were observed on both ureters and the right kidney pelvis.

Four days later, the patient was again cystoscoped. On this occasion, a more careful search of the bladder revealed the presence of two cysts at the bladder neck. Garceau catheters were passed up both ureters for 5 cm. Culture of the right kidney urine showed *Staphylococcus aureus*. That of the left side gave no growth. Pyelograms showed

clearly the presence of the filling defects in the left ureter and left pelvis (Fig 6)

The patient had a definite renal insufficiency, his urea concentration factor being only 22. On account of this, his age and his hypertensive cardiovascular condition, operation for the removal of the calculus was neither desired nor urged. Similarly, further ureteral dilatations were not possible.



FIGURE 6 Case 10

*Composite urogram. Note the filling defects in both ureters and kidney pelvis*

While operative confirmation was not secured, it is believed that this is a definite case of pyeloureterocystitis cystica.

#### SYMPTOMS

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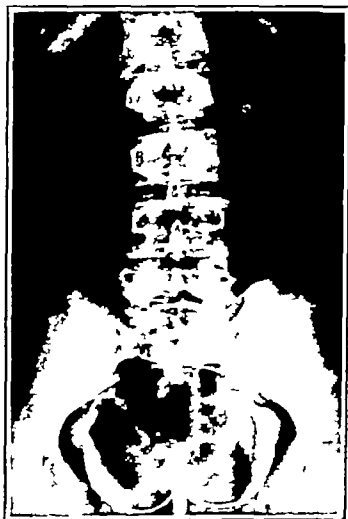


FIGURE 3 Case 9

*Ureterogram in which a clinical diagnosis of ureteritis cystica was made taken before ureteral dilatation. Note the bilateral ureteral block and the suspicious filling defects in ureters.*

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bladder orifice was found studded with small translucent cysts, most numerous on the floor and extending backward on the trigone. Both ureteral specimens showed 20 to 30 pus cells per high power field. Both catheters were blocked by obstructions about 10 cm. up the ureter. X ray studies with sodium iodide revealed dilated ureters below the point of obstruction (Fig 3). No filling defects were seen.

It was not possible to do anything more for the patient at this time owing to his unwillingness to follow any treatment. He was in the hospital on several occasions in 1936 and 1937 for brief examinations. On these occa-



FIGURE 4 Case 9

*Composite urogram taken after ureteral dilatation. Note the filling defects in the left lower and right upper ureters.*

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agency has developed, more radical procedures may be required, even the sacrifice of a kidney

### SUMMARY

The subject of pyelitis, ureteritis and cystitis cystica is reviewed

The literature of the subject is briefly reviewed, and 10 cases of pyelitis and ureteritis cystica in which a clinical diagnosis was made are reported, including 2 observed by the author

The genesis of the cysts is discussed and their evolution to cystitis glandularis is described

These conditions are probably not so rare as previously thought

The diagnosis of pyelitis cystica and ureteritis cystica is possible by urological study

The treatment is discussed

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- rence of the hematuria. The peculiar shadow shown in her ureter presented a picture which was thought to be a papilloma or some similar growth. This finding plus the hematuria led to operation. At operation the ureter was apparently normal except for a distinct, fixed kink several centimeters below the ureteropelvic junction. Just below the kink, beady masses could be felt. In the ureter were found multiple growths with an appearance suggestive of papilloma. Because of this, ureteronephrectomy was decided on. The specimen showed multiple small cysts which studded the ureter and renal pelvis. I had the opportunity of recystoscopy this patient, and I might say that nothing was observed except inflammatory changes in the bladder. In 1936 there was the same appearance. I recystoscoped this patient recently and there was the same condition in the bladder. There were petechial spots in the wall of the bladder and on the trigone and dome. There were a few cysts that had the size and appearance of tapioca. I did a ureteropyelogram by injecting the pelvis with sodium iodide. I injected the ureter and pelvis with 10 cc. of the 7 per cent solution. It showed nothing of importance. There was a normal-appearing bladder. I then used a Woodruff catheter, which helped to bring out the vacuoles quite plainly. Of course we did not recognize this condition, which was identified by the pathologist. Probably if we had recognized it we should have treated it conservatively, as Dr. Patch has suggested.

Dr. J. E. KERNEY, Providence, R. I. I should like to ask Dr. Bieberbach if these cases of ureteritis cystica could not have been treated by desiccation of the cysts. I believe that in addition to the treatment outlined by Dr. Patch, it might be well to desiccate them.

Dr. J. B. HICKS, Boston. While I was a member of the Lahey Clinic it was my privilege to do some 2000 cystoscopies. In this group I saw 2 cases that might be classified as cystitis cystica. The first patient, whom I saw ten years ago, was a woman thirty years old. There was no evidence of inflammation. She was treated by fulguration. She passed out of my care so that I was unable to follow her. The other case was that of a woman whom I saw in consultation with another doctor. She had been having painless hematuria for at least two years. Because of the hematuria, diagnoses such as stone, tumor and infection were considered. Cystoscopy showed definite evidence of bladder neck obstruction. Urine cultures, sediments and guinea pig inoculations were negative. Most of the time the urine was clear. The outstanding symptom was massive quantities of blood. The patient developed uremia and died. The presence of chronic inflammation in these conditions makes me think of infection as a possible etiologic agent. Possibly some of the viruses may be responsible for this condition. Dr. Patch did not mention tonight whether the urines were cultured in these cases. I should like him to bring this out.

Dr. RICHARD CHUTE, Boston. I have never seen a recognizable case of ureteritis cystica. A few cysts in the bladder are very common. Offhand I can think of a half-dozen patients with a few cysts of the bladder.

Dr. MYRON HAHN, JR., Boston. I have two small x-ray pictures here which I should like to show. The first is that of a man who came to the outpatient department complaining of pain in his back. The large cysts can be seen very plainly. One was protruding from the ureteral orifice. Puncturing these cysts relieved the backache. There was no operation. The patient returned to the clinic later, still without backache, and refused operation. The other picture brings out what Dr. Patch said about the condition at the lower end of the ureter, simulating

### DISCUSSION

Dr. W. D. BIEBERBACH, Worcester. In 1933 a patient was admitted to the Urological Service at the Worcester City Hospital, at which time she was cystoscoped because of costovertebral tenderness, pain in the flank and hematuria. Following the cystoscopy the patient was greatly improved for three months, after which there was a recur-

*aureus*, streptococcus, *Bacillus coli* and *Bacillus pyocyaneus*

#### DIAGNOSIS

The presence of cysts above the surface of the bladder in the region of the bladder neck makes recognition of cystitis cystica by cystoscopic observation fairly easy (Figs 7 and 8) Cystitis



FIGURE 7

*Cystoscopic appearance of the bladder in a case of bilateral nephrolithiasis, with cystitis cystica and suspected ureteritis cystica*

glandularis presents an irregular or mammillated appearance difficult to distinguish from cystitis cystica, except in microscopic sections At other times,

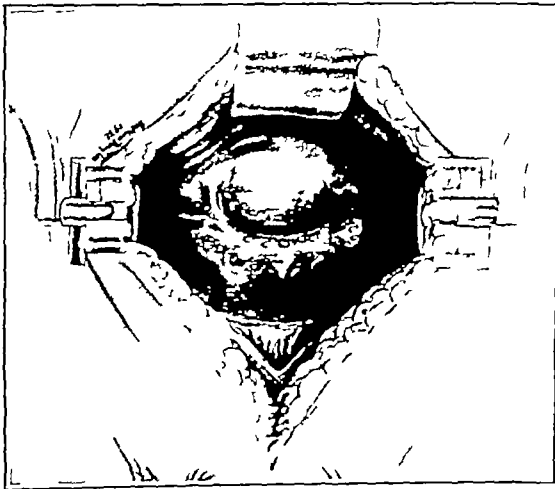


FIGURE 8

*Photograph of a drawing made at operation in a case of cystitis cystica and cystitis glandularis There were numerous cysts on the bladder base The patient had a vesical calculus and a ureterocele Complete cure followed operation*

cystitis glandularis may present itself as an ulceration, red and bleeding, or may be covered with a necrotic membrane One of our most characteristic sections was secured at autopsy No gross lesion

was observed The condition was not suspected until routine microscopic sections taken from the bladder neck revealed typical cystic and glandular cystitis, with associated leukoplakia

The diagnosis of pyelitis and ureteritis cystica is not so simple, but it should be obvious that with our present methods of urological study they may be readily recognized Wherever cystitis cystica is noted, the upper urinary tract should be given a more than usually close scrutiny Cystitis cystica is usually associated with a pyelitis or ureteritis cystica, or both, though not always In our second case it was only after noting the ureterographic picture that a careful search of the bladder revealed the presence of a few cysts in that viscus

Of prime importance in diagnosing ureteritis or pyelitis cystica, is the occurrence of vacuoles, bubbles or non-opaque filling defects in the urogram Before their true significance was realized, they were frequently confused with air bubbles or papillomas Another finding of significance is a dilatation, tortuosity or constriction of the ureters In the pelvis, there is found a spherical calculic dilatation, with narrowing of the calculopelvic junctures Hinman is insistent on the value of this sign, as also on the narrowing at the ureteropelvic juncture, with a spherical dilatation above. One must confess that such a finding in the absence of the typical vacuoles or filling defects is not entirely inconsistent with a diagnosis of chronic pyelonephritis

#### TREATMENT

This should very naturally be directed to the underlying inflammatory process Search for a causative factor should be our first objective If this factor is an obstructive one its removal where possible may bring about a complete subsidence of symptoms, and, as our own experience has taught us, particularly in the bladder variety, a complete disappearance of the cysts

Such therapy is easier to achieve in cystitis cystica, where the obstructing condition may be easily recognized and dealt with by operative therapy Where the condition is found in the upper urinary tract, the situation is not quite so satisfactory Some palliation may be possible, apart from that afforded by the removal of a calculus As constriction of the ureter is frequently present, and in any event the bulging cysts constitute undeniable obstacles to the free course of the urine, repeated ureteral dilatations, recommended by Kindall and followed by Hinman and ourselves, seem the logical procedure Associated with dilatation, Kindall and Hinman advise the instillation of silver nitrate, in a 1 or 2 per cent solution

If conservative measures fail, and renal insuffi-



blocks must have played a prominent part in the fatal ending.

I am convinced that if a careful watch is maintained, the conditions of ureteritis and pyelitis cystica will be found more frequently than in the past.

I lean very strongly to the view that a metaplastic process is responsible for the production of pyelitis, ureteritis and cystitis cystica, and that in its further development it may end in cystitis glandularis and even in malignancy.

## THE INTRAMUSCULAR USE OF THE MONOETHANOLAMINE SALT OF CEVITAMIC ACID IN PATIENTS WITH VITAMIN C DEFICIENCY\*

EUGENE L. LOZNER, M.D.,† FREDERICK J. POHLE, M.D.,‡ AND F. H. LASKEY TAYLOR, PH.D. §

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REPEATED clinical and laboratory studies have demonstrated that the oral administration of pure cevitic acid to the large majority of patients deficient in vitamin C causes a prompt amelioration of symptoms and a restoration of the vitamin C of the blood to normal concentration<sup>1,2</sup>. In certain patients, however, who cannot tolerate cevitic acid by mouth, or in whom gastric anacidity or the presence of pathologic changes in the bowel leads to destruction or poor absorption of the vitamin, the parenteral administration of vitamin C is an established clinical necessity<sup>2,3</sup>. In such patients intravenous administration has been widely used. This route, however, is associated with considerable loss of the vitamin through the kidneys as the renal threshold is exceeded,<sup>4,5</sup> and has the additional disadvantage of requiring venepuncture.

The intramuscular use of cevitic acid seems to offer a method of escaping these disadvantages. This relatively strong acid, however, if given intramuscularly and not neutralized causes considerable sloughing of the tissues.<sup>6</sup> Neutralization by sodium hydroxide or bicarbonate gives an injectable substance readily absorbed and utilized.<sup>6,7</sup> To make this preparation is time consuming, and requires considerable care if sterility is to be obtained without loss in potency. The monoethanolamine salt of cevitic acid is a neutral salt and can be prepared so as to form a sterile stable solution.<sup>11</sup> This paper reports an investigation of the intramuscular use of this material in 3 patients with vitamin C deficiency, and compares its effect with the oral and intravenous administration of crystalline cevitic acid.<sup>11</sup>

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital and the Department of Medicine, Harvard Medical School, Boston.

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\*Supplied through the courtesy of the Abbott Laboratories, North Chicago, Illinois, and marketed under the trade name of Cenolate.

†Supplied through the courtesy of Merck and Company, Rahway, New Jersey.

### METHODS

Patients were chosen for study who gave a history indicating marked reduction of vitamin C in their diet and who exhibited hemorrhagic manifestations of scurvy. Their blood showed a complete absence of the vitamin.

During the control period each patient was given a "house diet" free from citrus fruits. At the end of this period the twenty-four-hour specimen of urine and a sample of blood were analyzed and found to contain no cevitic acid. Each patient was then given 1 gm. of vitamin C by mouth and the blood level of the vitamin was determined after a half, one and a half, two and a half, four and twenty-four hours. Urine was collected for the twenty-four-hour period after the administration of the vitamin, in 2 of the patients the first five hour excretion was collected separately.

After the initial oral tolerance for vitamin C was concluded the patients were permitted to remain on the basic diet until the vitamin C was again absent from both blood and urine. The observations were then repeated following the intramuscular injection of 1 gm. of cevitic acid in the form of the monoethanolamine salt. When the effects of this administration of the vitamin had disappeared, as shown by a return to approximately the same initial level of cevitic acid in the blood, the observations were repeated after giving intravenously 1 gm. of crystalline cevitic acid.

In 1 patient the therapeutic use of monoethanolamine cevitamate was attempted at a dosage of 100 mg. a day given intramuscularly for eight days. In this individual the observations following the oral administration of 1 gm. of cevitic acid were repeated after the cevitic acid level in the blood had reached a normal figure.

The urine was collected in dark bottles and kept on ice, acetic acid and chloroform being used as a preservative. The vitamin C present in the reduced form was determined by the method of Faulkner and Taylor.<sup>4</sup> The reduced cevitic acid

ureteritis cystica but actually due to a papilloma of the ureter. This appeared to be one of those tumors that responded well to radiation. After a preliminary course of radiation the patient was operated on. At operation the kidney tumor and ureter were removed. This was a case of tumor implants and not ureteritis cystica.

DR. F. F. WEINER, Brockton. We have seen 2 cases of pyeloureteritis cystica at the Brockton Hospital. In one the patient was a woman of sixty whose chief complaint was hematuria. She was sent in for examination, and pyelograms were made. The diagnosis was very easy. The patient refused treatment because the symptoms stopped. There was an advanced condition of ureteritis cystica on one side, and a small number of vacuoles on the other. This emphasizes the bilaterality of the condition, which Dr. Patch has pointed out. The other case was that of a young man of twenty-three with hematuria and nothing else. In this case there were only three or four vacuoles in the kidney pelvis and upper ureter. We believed that the correct diagnosis was pyelitis and ureteritis cystica. We did nothing further because after his pyelography the patient had no further symptoms. I believe that palliative treatment was the proper procedure, because we do not know whether removing the kidney on that side would have prevented the occurrence of cysts on the other side. I also think that the other case was best handled conservatively. It was done three years ago and the patient is apparently in good health. She is getting along very well without further treatment.

DR. WILLIAM C. QUINBY, Boston. The subject of pyeloureteritis cystica which Dr. Patch has presented so conclusively forms a definite pathologic picture, but one in which we must be careful not to confuse our thoughts, for the phenomenon of cystic formation is not a disease in itself but merely the pathologic response of the urinary epithelium to some antecedent cause. In my experience this cause has usually been a deep-seated pyelonephritis of bacterial origin. Therefore, in using the term "pyeloureteritis cystica" one does not describe a disease but merely a condition.

The epithelium of the urinary tract has the property of undergoing metaplasia as a result of various forms of stimuli. Furthermore, we are all familiar with the so-called bullous edema sometimes seen in the floor of the bladder as a result of obstructive changes of the return circulation without the presence of bacteria. I refer to the bullous edema around the ureteral orifice before the passage of a calculus. Similarly, in conditions of renal infection of long standing, the obstruction of perivesical lymph channels may be so continuous as to cause the formation of cysts which, owing to metaplasia, form an epithelial lining with active secretion, finally resulting in the picture of cystic ureteritis which Dr. Patch has described. In a few well marked cases this cystic formation may be sufficiently extensive to cause mechanical obstruction in the ureter. But since all these ureters are somewhat dilated by the disease process, I do not see how further instrumental dilatation can bring anything more than transient relief. If permanent relief is to be achieved, one must be able to control the underlying cause, and this, as I have said, is usually a severe pyelonephritis—a condition in which cure is always difficult if not impossible. That an occasional cyst in the pelvis or ureter can be the cause of gross hematuria I very much doubt. Certainly bleeding cannot fairly be ascribed to such a condition unless every other source for it has been excluded.

DR. BIEBERBACH. I should like to ask Dr. Patch about our 2 cases as regards the bacteriology. Both had clear urines, the cultures of the urine were negative and the sediments were negative. In the case of the woman, prior to operation she had an infection on the opposite side which was due to the staphylococcus. She got along satisfactorily with this cystic condition. In this case the condition was not secondary to infection. The kidney function was normal, dye appearing in four minutes. The blood nonprotein nitrogen was normal.

DR. ROSS MINTZ, Boston. I should like to ask Dr. Patch whether he considers cystitis cystica and cystitis glandularis as pathological entities. Is cystitis cystica an end result, or is cystitis glandularis an end result of cystitis cystica?

DR. PATCH. It seems that my endeavor to summarize has caused confusion in the minds of some, and I am grateful to Dr. Quinby for clarifying the situation so ably, and drawing your attention to the fact that these different varieties of cystic inflammation are not clinical entities. This will appear quite clearly, I hope, in the published version of my paper.

With regard to the question as to the value of decapsulation of the cysts, I should point out that this procedure does not deal with the underlying condition responsible for them, and therefore gives only temporary relief. In the presence of such a condition, the important considerations are the diagnosis of the underlying cause and its relief, whether it be calculus, obstructive factor or whatever condition is responsible for the chronic inflammation that has resulted in the cystic formations.

Ureteral dilatation does have a value in cases where the cystic accumulations in the ureter have obstructed the ureter, by producing an improvement in drainage through it. In cases where there is no obvious indication for operative interference, ureteral dilatation is to be recommended as a palliative measure. In several of the reported cases, as in one of ours, it was followed by definite improvement.

With regard to the frequency of these conditions of cystic formation, they occur much more frequently than is generally thought to be the case. In my paper, I quoted Morse, who found that cysts were present in the bladder of 17 per cent of 190 cases examined cystoscopically. In the bladder, its recognition is naturally easier than in the ureter or the kidney pelvis. I am convinced, however, that more careful study of pyelograms, and in particular more careful ureterography, will reveal cases which have formerly been overlooked.

Dr. Hicks asked a question as to the cultures in these cases. The bacterial flora is quite varied, but without any special significance.

Answering Dr. Quinby as to why these cases should bleed so freely, I am afraid that I cannot give a satisfactory explanation. That they do bleed at times, and very freely, is an undoubted fact. Frequently a diagnosis of tumor has been made and the kidney removed, and the true condition revealed by the pathologist. I have thought that obstruction to urinary outflow played an important role. Certainly ureteral dilatation has produced a definite improvement in my experience and that of others. I assume that dilatation effected a freer urinary outflow.

The obstruction of the ureters by the masses of cysts must have played a part in producing death in some of the cases. This is well shown in two of the Peter Bent Brigham cases in which uremia caused death and the lesions were discovered post mortem. In these cases, while there were other obstructive factors, the ureteral

intramuscular administration of 100 mg of cevitic acid as the monoethanolamine salt. In eight days the blood level rose from 0.12 to 0.81 mg per 100 cc of blood plasma. The oral administration of 1 gm of vitamin C at this time showed a prompt rise in the blood plasma cevitic acid to 1.77 mg per 100 cc. Data for the two oral tolerance

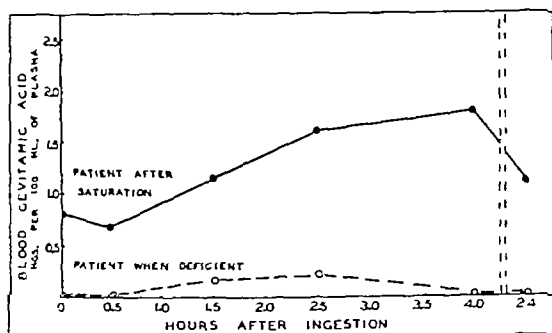


FIGURE 2.

*The effect of the oral administration of 1.0 gm of vitamin C on the concentration of cevitic acid in the blood plasma of a patient (Case 3) with vitamin C deficiency before and after saturation with the intramuscular administration of 100 mg of monoethanolamine cevitate daily for eight days*

tests are summarized in Table 1, and the curves are shown in Figure 2. One hundred and sixteen milligrams of cevitic acid was excreted into the urine during the twenty-four hours following the ingestion of the vitamin C, the largest amount being excreted between the sixth and the twenty-fourth hours.

Eleven intramuscular injections of a solution of the monoethanolamine salt of cevitic acid in doses ranging between 0.1 and 1.0 gm were given, without any immediate or delayed, local or systemic reactions.

## CONCLUSIONS

The intramuscular injection of the monoethanolamine salt of cevitic acid presents a simple and effective way of administering vitamin C parenterally when need for this type of injection is indicated.

There were no immediate or delayed, local or systemic reactions following its use in the 3 patients studied.

Its intramuscular administration was followed by a prompt increase in the vitamin C of the blood. The loss of vitamin C in the urine was not so marked as when crystalline cevitic acid was given intravenously.

A patient with marked vitamin C deprivation was saturated in eight days by the daily intramuscular injection of 100 mg of cevitic acid as the monoethanolamine salt.

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acid in the blood was determined by the method of Farmer and Abt<sup>8,9</sup>

RESULTS

Table 1 and Figures 1 and 2 show the data obtained for the 3 subjects studied. Following the

was not so great as that which followed the intravenous administration of the vitamin, and the loss in the urine was much less. From 60 to 140 mg of cevitamic acid, or between 6 and 14 per cent of the amount of the vitamin injected, was excreted in the urine during the twenty-four hours

TABLE 1 The Effect of Route of Administration of 1 Gm of Vitamin C on the Concentration of Cevitamic Acid in the Blood and Urine

Case No	HOURS AFTER ADMINISTRATION	PLASMA CEVITAMIC ACID CONTENT			URINE CEVITAMIC ACID EXCRETION		
		METHOD OF ADMINISTRATION			METHOD OF ADMINISTRATION		
		Oral	Intra muscular	Intra venous	Oral	Intra muscular	Intra venous
		mg %	mg %	mg %	mg	mg	mg
1	0 (control)	0	0	0.17	5	—	—
	1/2	0	2.56	3.21		—	—
	1 1/2	0.07	2.48	1.70		—	—
	2 1/2	0.18	2.13	1.50		—	—
	4	0.20	1.52	1.22		—	—
	24	0	0.12	0.36	24	0	174
2	0 (control)	0	0	0.25	5	0	57.2
	1/2	0	1.23	3.65		—	—
	1 1/2	0.33	1.98	2.21		—	—
	2 1/2	0.51	1.66	2.86		—	—
	4	0.52	0.66	0.98		—	—
	24	0	0.43	0.40	24†	0	60.1
3*	0 (control)	0	0	0.12	5	0	70.1
	1/2	0	0.73	6.24		—	—
	1 1/2	0.15	1.72	3.28		—	—
	2 1/2	0.23	1.86	2.09		—	—
	4	0	1.50	1.27		—	—
	24	0	0.37	0.83	24†	0	98.2
3†	0 (control)	0.81			5	2.7	
	1/2	0.71				—	—
	1 1/2	1.14				—	—
	2 1/2	1.60				—	—
	4	1.77				—	—
	24	1.19			24‡	115.8	

\*Tests conducted during deficient state.  
†Oral test repeated after saturation with 100 mg of monoethanolamine cevitamate intramuscularly daily for eight days.  
‡24 hour values include five hour values.

oral administration of 1 gm of vitamin C there was little change in the subnormal cevitamic acid levels of the blood of these patients. No vitamin was found in the urine during the twenty-four hours following ingestion of cevitamic acid. In 1 individual it was at first suspected that the absorption of the vitamin might have been impaired. Glucose-tolerance studies on this patient, however, revealed no abnormality of sugar absorption as measured by the form of the blood-sugar curve.

When 1 gm of vitamin C dissolved in isotonic salt solution was given by vein there was a prompt rise of the blood level of the vitamin, followed by marked excretion into the urine as the renal threshold for the vitamin was exceeded. In confirmation of the observations of Wright, Lilientel and MacLenathen,<sup>10</sup> the excretion occurred chiefly in the first five hours. The twenty-four-hour excretion of cevitamic acid ranged between 174 and 265 mg, or between 17 and 27 per cent of the amount of vitamin given.

Following the intramuscular administration of 1 gm of cevitamic acid in the form of the monoethanolamine salt, there was again a prompt rise in the blood level of cevitamic acid. The rise

following administration. Most of this excretion occurred in the first five hours following administration. The rate of rise in the blood level

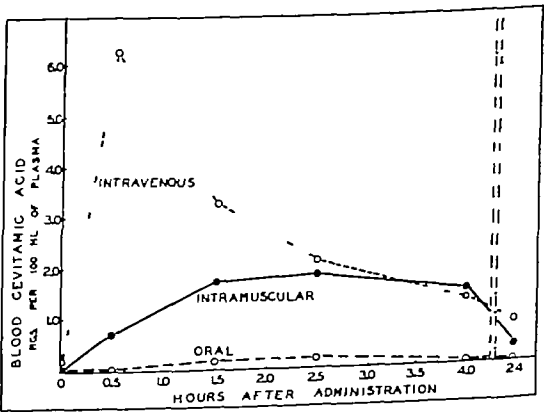


FIGURE 1  
The effect of route of administration of 10 gm of vitamin C on the concentration of cevitamic acid in the blood plasma of a patient (Case 3) with vitamin C deficiency.

of the vitamin indicated a good rate of absorption.

One patient (Case 3) was saturated by the daily

intramuscular administration of 100 mg of cevitic acid as the monoethanolamine salt. In eight days the blood level rose from 0.12 to 0.81 mg per 100 cc. of blood plasma. The oral administration of 1 gm of vitamin C at this time showed a prompt rise in the blood plasma cevitic acid to 1.77 mg per 100 cc. Data for the two oral tolerance

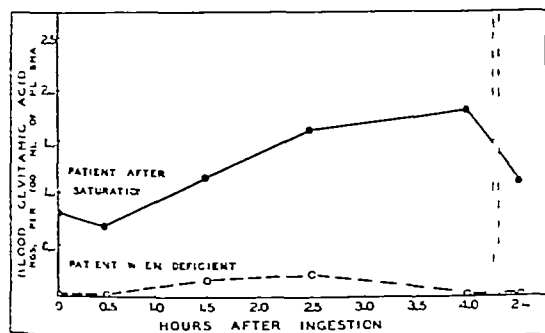


FIGURE 2.

*The effect of the oral administration of 1.0 gm of vitamin C on the concentration of cevitic acid in the blood plasma of a patient (Case 3) with vitamin C deficiency, before and after saturation with the intramuscular administration of 100 mg of monoethanolamine cevitate daily for eight days*

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## METRAZOL TREATMENT OF DEPRESSIONS\*

FRANCES COTTINGTON, M.D.,† AND ARTHUR J. GAVIGAN, M.D.‡

WORCESTER, MASSACHUSETTS

ON THE basis of the data published by Low et al.,<sup>1</sup> which indicated favorable results with Metrazol therapy in the affective psychoses, in 1938 we began an investigation of a group of 20 depressed women patients at the Worcester State Hospital. The purpose of this paper is to indicate the results obtained and to describe certain phenomena observed in the course of the treatments. Within recent months several reports have appeared in the literature. Low states that 13 of his 16 treated manic-depressive patients recovered, Bennett<sup>2</sup> announced uniformly good results in 21 cases, Cook<sup>3</sup> called his 4 recoveries in 5 cases promising and dramatic, and Serko<sup>4</sup> cited 2 cases with recovery.

The rationale of Metrazol therapy in depressed states is at present unknown. Bennett<sup>2</sup> has stated that the effects are probably due to the ability of the treated patient to prove to himself his willingness to undergo punishment, with subsequent resolution of guilt and lifting of the depression. The various theories underlying the *modus operandi* of Metrazol which have been advanced by Von Meduna,<sup>5</sup> Friedman<sup>6</sup> and Gellhorn<sup>7</sup> in the treatment of schizophrenia may or may not be applicable to the treatment of the depressions. It is beyond the intention of this report to enter this controversial field.

## METHOD

Prior to the beginning of treatment all patients were examined in order to determine any physical disability contraindicating treatment. Laboratory examinations included x-ray examination of the chest and blood and urine studies. The finding of a systolic blood pressure over 150 mm of mercury, a diastolic blood pressure over 90 mm, marked retinal arteriosclerosis, impaired cardiac function or any febrile illness was each considered as a contraindication.

Metrazol (Bilhuber-Knoll) was administered intravenously in 10 per cent aqueous solution, the initial dose was 3 cc, which was increased by 1-cc increments until the convulsive threshold was reached. The dose was further increased by 1-cc amounts when tolerance to the drug, as manifested by the absence of the grand-mal seizure, devel-

oped during the course of treatments. Doses were given three times weekly, not less than one hour following and one hour preceding meals. They were continued until remission occurred. In 3 cases treatments were discontinued after the apparent maximum improvement had been attained.

The greatest improvement following individual treatments seemed to occur after seizures of the grand-mal type. After seizures of the petit mal, abortive-tonic or confusional type, many patients became more agitated and apprehensive.

No formal psychotherapy was administered during the course of treatment. However, reassurance was necessary from time to time for some patients in order to allay apprehension regarding the treatments.

The only complication encountered was occasional bilateral dislocation of the mandible, which was usually reduced spontaneously after relaxation of the muscles. It is our opinion that careful nursing procedure during and immediately following the seizure is the most important factor in reducing the possibility of fractures and dislocations which may occur during the course of therapy. Two nurses were employed during each seizure to hold the patient in such a way as to prevent abduction at the hips and shoulders.

## CLINICAL MATERIAL AND RESULTS

Of the 20 patients treated, those who were between forty and sixty years of age and who had had no previous attacks of mental disorder were classified as involutional psychoses. When paranoid ideas were prominent these patients were considered to be of the paranoid type, otherwise they were considered to be of the melancholic type. Those patients below forty, and also those who had had previous attacks of mania or depression, were considered as having manic-depressive psychoses. All were of the depressed type. There were 3 castrates (Cases 1, 3 and 7), and 6 patients (Cases 4, 5, 10, 11, 12 and 18) were known to have passed through the menopause. The duration of mental illness prior to the institution of treatment ranged from two months to five years. Some of these patients had been treated with amphetamine (Benzedrine), Progynon, Emmenin or Theelin with no noteworthy effects, these treatments had been discontinued at least three months before treatment with Metrazol was begun.

The essential data concerning these patients, the

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nature of the Metrazol treatment and the clinical results are presented in Table 1. The time which has elapsed since treatment was discontinued varies from one to five and a half months, the average period being three months.

#### DISCUSSION

Of the 20 patients treated, 17 (85 per cent) had complete remission of symptoms and 3 (15 per

cent) of time following seizures. Delusions and delusional ideas were in all cases the last of the symptoms to disappear, and were put forward by the patients with diminishing conviction as treatment progressed.

The patients who underwent remissions were able to return at once to their previous occupations. Information concerning them was obtained by monthly interviews and correspondence after their

TABLE 1 *Clinical Effect of Metrazol Treatment in Depressions*

DIAGNOSIS	CASE	AGE	PREVIOUS ATTACKS	DURATION OF ILLNESS	PREVIOUS TREATMENT	NO OF METRAZOL TREAT- MENTS	NO OF SEIZURES	MAXIMUM DOSE	RESULT
		yr		yr				cc	
Involuntional psychosis (paranoid type)	1	52	0	2	Amphetamine	6	5	4	Remission
	2	46	0	5	0	13	7	8	Remission
	3	46	0	2	Progynon Amphetamine	19	14	7	Remission
	4	54	0	2/3	0	20	10	8	Remission
	5	52	0	4 1/2	Emmenin	40	34	5	Improved
	6	43	0	3 1/2	Photodyne Progynon	9	6	7	Remission
Involuntional psychosis (melancholic type)	7	49	0	1 1/4	Emmenin	5	5	3	Remission
	8	41	0	1 3/4	0	11	3	9	Remission
	9	45	0	2 1/2	0	17	6	8	Remission
	10	56	0	1/6	0	13	10	7	Remission
	11	55	0	2/3	Amphetamine	23	11	9	Improved
	12	50	0	1/6	0	1	1	3	Remission
Manic-depressive psychosis (depressed type)	13	54	0	2	0	8	3	7	Remission
	14	40	0	3 1/2	Theelin Amphetamine	9	4	7	Remission
	15	28	0	1/2	Progynon	16	10	6	Remission
	16	42	2 (depressed)	2	Progynon Amphetamine	3	3	3	Remission
	17	32	3 (depressed)	1/2	0	13	6	7	Remission
	18	59	2 (depressed) 1 (manic)	2/3	0	2	1	3	Remission
	19	45	5 (depressed)	1 1/2	0	9	7	4	Improved
	20	36	1 (manic)	1 2/3	0	12	7	8	Remission
						14	11	7	Remission

cent) manifested definite improvement. Of the 3 patients who underwent no remission but did improve, all were over fifty years of age, and 2 had minimal retinal arteriosclerosis. There was no correlation between the duration of illness prior to the institution of treatment and the degree of success. In the 3 patients who did not have a remission, the duration of illness ranged from eight months to five years. There was no correlation between the age of the patient or the duration of illness and the number of treatments required to produce a remission.

Motor activity was the first symptom to become normalized in all cases except Cases 4, 7 and 14, in which all symptoms disappeared suddenly. Agitated patients became quiet and obvious tenseness disappeared, retarded patients became sufficiently active to participate in productive work. Following the return to a normal degree of activity the mood lifted—in some cases suddenly and completely, in others for increasingly longer pe-

riods of time following seizures. One patient (Case 12) returned voluntarily for a second course of treatments, stating that on resuming a difficult domestic situation she noted recurrence of depression and feelings of guilt, she again underwent a full remission. With this exception all patients stated that there had been no return of their former symptoms. Tension and anxiety were at times manifested during the interviews following remission, when some patients discussed certain phases of their personal life. These states were, however, readily overcome by the patients themselves before the termination of the interview. This material had not been expressed during the psychosis. No emotional reaction was evidenced in discussing ideas expressed during the acute period of the psychosis.

During the course of treatments, 7 patients (Cases 4, 5, 8, 11, 14, 16 and 19) had somatic complaints, for example backache, pains in the joints, palpitation, weakness, epigastric pain, prick-

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The patients who underwent remissions were able to return at once to their previous occupations. Information concerning them was obtained by monthly interviews and correspondence after their

TABLE 1 *Clinical Effect of Metrazol Treatment in Depressions*

DIAGNOSIS	CASE	AGE	PREVIOUS ATTACKS	DURATION OF ILLNESS	PREVIOUS TREATMENT	NO OF METRAZOL TREAT- MENTS	NO OF SEIZURES	MAXIMUM DOSE	RESULT
		yr		yr				cc	
Involutional psychosis (paranoid type)	1	52	0	2	Amphetamine	6	5	4	Remission
	2	46	0	5	0	13	7	8	Remission
	3	46	0	2	Progynon Amphetamine	19	14	7	Remission
	4	54	0	2/3	0	20	10	8	Remission
	5	52	0	4 1/2	Emmenin	40	34	5	Improved
	6	43	0	3 1/2	Photodyn Progynon	9	6	7	Remission
Involutional psychosis (melancholic type)	7	49	0	1 1/4	Emmenin	5	5	3	Remission
	8	41	0	1 3/4	0	11	3	9	Remission
	9	45	0	2 1/2	0	17	6	8	Remission
	10	56	0	1/6	0	13	10	7	Remission
	11	55	0	2/3	Amphetamine	23	11	9	Improved
	12	50	0	1/6	0	1	1	3	Remission
						8	3	7	Remission
	13	54	0	2	0	9	4	7	Remission
Manic-depressive psychosis (depressed type)	14	40	0	3 1/2	Theelin Amphetamine	16	10	6	Remission
	15	28	0	1/2	Progynon	3	3	3	Remission
	16	42	2 (depressed)	2	Progynon Amphetamine	13	6	7	Remission
	17	32	3 (depressed)	1/2	0	2	1	3	Remission
	18	59	2 (depressed) 1 (manic)	2/3	0	9	7	4	Improved
	19	45	5 (depressed)	1 1/2	0	12	7	8	Remission
	20	36	1 (manic)	1 2/3	0	14	11	7	Remission

cent) manifested definite improvement. Of the 3 patients who underwent no remission but did improve, all were over fifty years of age, and 2 had minimal retinal arteriosclerosis. There was no correlation between the duration of illness prior to the institution of treatment and the degree of success. In the 3 patients who did not have a remission, the duration of illness ranged from eight months to five years. There was no correlation between the age of the patient or the duration of illness and the number of treatments required to produce a remission.

Motor activity was the first symptom to become normalized in all cases except Cases 4, 7 and 14, in which all symptoms disappeared suddenly. Agitated patients became quiet and obvious tenseness disappeared, retarded patients became sufficiently active to participate in productive work. Following the return to a normal degree of activity the mood lifted—in some cases suddenly and completely, in others for increasingly longer pe-

riods of time following seizures. One patient (Case 12) returned voluntarily for a second course of treatments, stating that on resuming a difficult domestic situation she noted recurrence of depression and feelings of guilt, she again underwent a full remission. With this exception all patients stated that there had been no return of their former symptoms. Tension and anxiety were at times manifested during the interviews following remission, when some patients discussed certain phases of their personal life. These states were, however, readily overcome by the patients themselves before the termination of the interview. This material had not been expressed during the psychosis. No emotional reaction was evidenced in discussing ideas expressed during the acute period of the psychosis.

During the course of treatments, 7 patients (Cases 4, 5, 8, 11, 14, 16 and 19) had somatic complaints, for example backache, pains in the joints, palpitation, weakness, epigastric pain, prick-

ling sensations in the scalp and blurred vision. Physical, x-ray and ophthalmoscopic examinations gave no evidence of any somatic basis for these symptoms. It was noted that these complaints were more numerous following seizures of the petit-mal or confusional type, and were less frequent or absent following seizures of the grand-mal type. The complaints made their appearance as the depression lifted and as the ideas of guilt or persecution diminished, and in every case had disappeared by the time remission had occurred. It seemed possible that repressed material was being symbolically expressed in the form of somatic symptoms.

During the course of therapy, 6 patients (Cases 4, 10, 14, 16, 19 and 20) complained of loss of memory for certain material. However, examination revealed that there was no memory defect, and that some of the patients were apparently complaining of inability to concentrate, many of the patients showed, however, considerable affectivity when some of the "forgotten" ideas were recalled, indicating that they might have been wishfully forgetting (repressing) this material.

#### SUMMARY

Metrazol therapy was carried out in a group of 20 depressed women patients, classified as having

involuntional and manic-depressive psychoses. The age range was twenty-eight to fifty-nine, and the patients had been ill from two months to five years. Treatments were administered three times weekly beginning with a dose of 3 cc of 10 per cent aqueous solution of Metrazol, which was increased as necessary to obtain typical grand-mal seizures, the treatments were discontinued when remission or considerable improvement had taken place. In this series, 17 patients underwent full remission of symptoms and 3 manifested improvement. The order of disappearance of psychotic symptoms is described and certain clinical features associated with this form of treatment are discussed. These results indicate that further trial with Metrazol is warranted in the treatment of depressions of these types.

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## CALCIFIC AORTIC STENOSIS—A CLINICAL ENTITY

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THE last decade has witnessed notable advances toward the fuller recognition of calcific aortic stenosis as a clinical entity. Data have been assembled producing a picture so characteristic that an increase in the frequency with which this diagnosis is correctly made may be expected. When it is appreciated that several other entities, including angina pectoris and coronary thrombosis, may be simulated by calcific aortic stenosis, its importance from a practical as well as an academic view can be seen.

#### HISTORY

Although Monckeberg<sup>1</sup> is justly credited with the first comprehensive pathological identification of calcific aortic stenosis and Christian<sup>2</sup> is similarly credited for emphasizing it as a clinical entity, the

older literature abounds with cases of calcific aortic stenosis with typical clinical pictures. Cases are found in which, despite incomplete data, the diagnosis could very reasonably have been made had the present-day improved clinical methods been available. Thus, Boneti<sup>3</sup> in 1700 stated that Rayger in 1672 reported sudden death in a patient with calcific aortic cusps. Lloyd<sup>4</sup> in 1846 reported sudden death in a man of fifty-three with calcific aortic stenosis and a hypertrophied heart. Gautier<sup>5</sup> in 1860 reported sudden death in a boy of twelve with calcific aortic stenosis and a normal mitral valve. Peacock<sup>6</sup> reported sudden death in a man of twenty-three who had calcific aortic stenosis and aortic insufficiency with a hypertrophied heart. Budin and Decaudin<sup>7</sup> reported a woman of forty-eight who died suddenly; they noted calcific aortic stenosis and aortic insufficiency with thickened,

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fused, calcific valve cusps Wilks and Moxon<sup>8</sup> as early as 1875 called attention to the connection between aortic stenosis and sudden death

The morbid anatomy of aortic stenosis has received much detailed study, dating especially since 1904, when Mönckeberg's<sup>7</sup> classical paper defined the pathologic alterations produced in this condition. Since then notable studies in this field have been made by Margolis, Ziellessen and Barnes,<sup>9</sup> Sohval and Gross,<sup>10</sup> Lesnick and Schlesinger<sup>11</sup> and Clawson et al.<sup>12</sup>

Christian<sup>2</sup> predicted the possibility of the x-ray demonstration of cardiac calcification in vivo, and recently Sosman and Wosika<sup>27</sup> first reported such a case

In the field of clinical physiology, the pulsus tardus et parvus was long recognized by the older writers. Recent contributions concerning the physiology and hemodynamics of aortic stenosis have been made by Eyster, Meek and Hodges<sup>13</sup> in 1927, Katz, Ralli and Cheer<sup>14</sup> in 1928 and Green<sup>15</sup> in 1936

Important summaries of extended clinical observations of calcific aortic stenosis have been published by Contratto and Levine,<sup>16</sup> McGinn and White,<sup>17</sup> Willius<sup>18, 19</sup> and Willius and Camp<sup>20</sup>

#### ETIOLOGY

Campbell and Shackle<sup>23</sup> investigated the etiologic factors in 296 cases of all types of aortic valvular disease. They found that acute rheumatism accounted for 200 cases, syphilis for 55, atheroma for 20 and all other causes for 21. Contratto and Levine<sup>16</sup> reviewed 180 cases of aortic stenosis and found a definite history of rheumatic fever in 57 (32 per cent). They believe that many additional cases could have been classified in this latter category if more careful histories had been elicited and if patients could have more readily recalled minor yet typical rheumatic episodes early in life. They concluded that rheumatic fever is the most frequent and most important cause of aortic stenosis.

Uniformity of opinion concerning the etiology of calcific aortic stenosis as distinct from aortic stenosis in general has not yet been reached. Mönckeberg<sup>7</sup> believed the former to be a degenerative disease with a resulting deposit of calcium. Cabot<sup>21</sup> acknowledged infection as a factor but believed the nature of the infectious process to be different from that occurring in the presence of rheumatic valvular disease. Margolis, Ziellessen and Barnes<sup>9</sup> claimed an inflammatory basis in some cases and a degenerative process in others. Boas<sup>22</sup> believed calcific aortic stenosis to be rheumatic in origin. Sohval and Gross<sup>10</sup> in their close study of calcific sclerosis of the aortic valve concluded

that the disease was purely degenerative showing practically none of the stigmas of rheumatic activity. They suspected that the process depended on individual predisposition to collagen involution and deposition of lipid and calcium.

Christian<sup>2</sup> has been impressed with the frequent history of rheumatism in early life, and, contrary to his own view in 1928,<sup>28</sup> now thinks that the lesion is rheumatic in origin. Mallory<sup>24</sup> believes that calcareous aortic stenosis is very rarely rheumatic in origin. Although Willius<sup>18</sup> holds that the process is inflammatory, its exact nature still being unknown, he points out the following factors against rheumatic fever as the etiologic agent: the overwhelming predominance of the disease in men relatively late in life, the low incidence of rheumatic fever (21 per cent of 77 reported cases), and the rarity of pericardial involvement. As an argument against an atherosclerotic genesis he called attention to the remarkable paucity of atherosclerosis in portions of the cardiovascular system other than the valve leaflets, annulus and a small contiguous portion of the aorta. It is generally conceded that the relative freedom from atherosclerosis in the supra-auricular portion of the aorta may be due to the protection afforded by the low pressure effected by the calcific aortic stenosis. Berk and Dinnerstein<sup>25</sup> on the basis of their study concluded that the etiology is still unknown but favored the possibility of a primary degeneration. Other findings which militate against the possibility of rheumatic etiology may be cited: the solitary occurrence of the lesion, that is, the absence of involvement of the mitral valve, the lack of appreciable thickening or shortening of the chordae tendineae, the massive deposits of calcium, and the absence of Aschoff bodies in the myocardium. Against arteriosclerosis, on the other hand, may be cited the absence of any marked sclerotic changes elsewhere in the body. Lesnick and Schlesinger<sup>11</sup> in a study of 39 cases of calcific aortic stenosis found 17 to have no associated mitral deformity and 22 to have an associated deformity of the mitral valve of rheumatic origin. They concluded that calcific aortic stenosis was not always rheumatic in origin, but thought that in some cases the underlying etiologic factor was probably of the nature of an arteriosclerotic degeneration. Clawson, Noble and Lufkin<sup>12</sup> concluded from a study of 200 cases that calcific aortic stenosis was the commonest healed aortic lesion and that the change in the valve was due to repeated attacks of rheumatic proliferative inflammation with calcification similar to that commonly seen in mitral cusps.

The decision concerning the etiology must depend finally on thorough examination of the heart for the presence of rheumatic stigmas.

The hypothesis that calcific aortic stenosis represents the healed stage of subacute bacterial endocarditis usually fails to find corroboration in the absence of a history of prolonged febrile illness and in the lack at necropsy of healed embolic visceral lesions

#### INCIDENCE

Calcific aortic stenosis occurred<sup>17</sup> in 18 per cent of 6800 autopsied cases or 2.3 per cent of 4800 autopsied cardiovascular-disease cases

#### AGE AND SEX

The combined data of several investigators<sup>20 11 8 16</sup> showed 180 men (67.9 per cent) affected in a total of 265 cases. The same data revealed the greatest incidence in the middle and older age groups. In one series<sup>16</sup> the average age in 180 cases was fifty-two years and six months.

#### MORBID ANATOMY

Mönckeberg<sup>1</sup> believed that the anatomical alterations in calcific aortic stenosis were due to primary sclerocalcific changes. He regarded the process as originating in small atheromatous plaques situated in the sinus pockets, and believed that these plaques increased in extent and ascended toward the free border of the valve. He appreciated the necessity of differentiating the process from results of rheumatic fever, pointing out an important feature, namely, that the sclerotic and calcific process is largely present in the fibrosa layer of the aortic valve, whereas when it occurs as a secondary process in rheumatic fever it is confined chiefly to the ventricularis layer.

Willius<sup>18</sup> demonstrated that calcific aortic stenosis is usually limited to the cusps themselves. Variable amounts of calcareous material are deposited, primarily involving the aortic annulus, frequently one of the valve commissures and valve leaflets, although the free margin of the leaflets is involved chiefly when the process is very extensive. Fusion of the leaflets tends to occur, producing an adynamic valve which results in a barrier where stenosis predominates, but lesser degrees of aortic insufficiency may also be present. The calcareous process rarely involves the aorta itself except the immediately contiguous segment, and never involves the region where the coronary arteries originate. The left ventricle undergoes hypertrophy. An associated pericarditis is rare.

Sohval and Gross<sup>10</sup> made an extensive study of the anatomy of calcific sclerosis of the aortic valve (Mönckeberg type). They found

The valves are transformed into stiffened irregular nodular leaves with most of the thickening taking

place throughout the body of the leaflets rather than at the free edge. In advanced stages secondary sclerotic transformation produces extraordinary and bizarre deformities. Nodules vary in extent, extremely hard and rounded or sharply irregular, often penetrating through the ventricularis and auricularis enveloping layers of the cusp. Commissural agglutination may be sharp in milder forms and in advanced forms may be broadened, nodular and distorted, thus differing from the evenly rounded and broadened lesions often seen in subacute bacterial endocarditis, as well as from the delicate, grooved agglutinations found in the pure rheumatic process. The edges of the aortic leaflets in Mönckeberg's sclerosis may be sharp, or thickened and distorted, and do not usually present the rolled and inverted gross configurations characteristic of the rheumatic lesion. Histologically the earliest change is seen in the fibrosa layer near the base of the leaflet. Sclerotic and hyalin changes followed by lipoid changes occur. Next there is a deposition of calcific material. The nuclei in the fibrosa collagen tend to disappear. Capillarization of the aortic ring may occur if the process is close to the ring. In contrast to this the rheumatic calcified valve presents thickening and often vascularization of the spongiosa and ventricular layers in which calcification also occurs. Lesions of the valve ring are almost invariably present.

Sohval and Gross<sup>10</sup> believed that the pathogenesis of Mönckeberg's sclerosis was purely and primarily degenerative in character, showing practically none of the characteristics of rheumatic activity. They thought that the process probably depended on an individual predisposition to collagen involution and deposition of lipoid and calcium.

Berk and Dinnerstein<sup>25</sup> found involvement of the aortic ring, primarily at the roots of the valve. In the first stage only the outer layer at the site of the sinus of Valsalva was affected. Calcification then extended into the leaflets or one of the commissures, bulged into the sinuses of the valves, or formed radiating buckles within the valves themselves. Deposits of lime salts often filled the sinuses completely. The condition frequently progressed into the ventricles, producing spur-like formations under the endocardium. They found that calcification of the aortic valve might occur in combination with calcification of the annulus fibrosus or might be entirely isolated. The valves themselves were thickened, had an irregular surface and were fused at the commissures. The places of fusions often shrunk considerably and in so doing usually caused stenosis of the valves.

Margolis, Ziellensen and Barnes<sup>9</sup> found a tendency to hyalinization of the connective tissue with a deposition of lipoid material in the aortic valve ring and in the aortic valve with subsequent calcification. They believed that some cases had an inflammatory, others a degenerative basis. Ischemia, due to diminution of the vascular supply of the

affected tissues, seemed to be the basic pathogenic factor, producing hyalinization and other degenerative changes which subsequently proceed to calcification. The diminished blood supply might be due to narrowing or possibly obliteration of the arterioles of the aortic valve ring either as a part of generalized arteriosclerosis or as a selective and localized process, degenerative and calcareous deposits in the valves thus being produced.

Boas<sup>22</sup> alluded to the occasional extension of the fibrosis and calcification from the aortic ring to the annulus fibrosus and to the interventricular septum, with frequent impingement on and replacement of the atrioventricular bundle, such a change produced an anatomical basis for conduction defects in patients with calcific aortic stenosis.

### PHYSIOLOGY

Eyster, Meek and Hodges<sup>13</sup> found that experimental aortic stenosis and insufficiency in dogs were usually associated with a gradually developing cardiac hypertrophy. The heart with aortic insufficiency before hypertrophy developed failed to react as effectively to an overload as did the normal heart. There were no electrocardiographic changes characteristic of the early dilatation or hypertrophy subsequent to aortic lesions. Even extreme degrees of dilatation in the normal heart failed to cause significant changes in the electrocardiogram.

Katz, Ralli and Cheer<sup>14</sup> recorded the cardiodynamic changes in the aorta and left ventricle due to stenosis of the aorta by means of simultaneous pressure curves from the left ventricle and aorta. The disappearance of the similarity of the basic form of the two pressure curves during ejection when the aorta was stenosed arose from the fact that the two chambers were no longer in free communication while blood was being ejected. The faster and larger rise in ventricular pressure during ejection as compared with the slower and smaller rise in aortic pressure, was due to the decrease in the rate of conversion of potential mechanical energy in the ventricle to kinetic energy of flow. The lowering of the aortic pressure levels and the decrease in pulse pressure were due to the diminution in systolic discharge and minute output of the heart—obviously caused by utilization of more of the mechanical energy of the ventricle so as to overcome the added obstruction caused by the stenosis. In marked stenosis the effect of the increase in diastolic stretch may be large enough to counterbalance the primary effect of the aortic constriction and cause a temporary rise in pressure levels.

Green<sup>15</sup> found a decrease in coronary flow mainly

during systole in aortic stenosis, and believed that it caused a relatively high degree of systolic peripheral coronary resistance in relation to aortic pressure.

Boas<sup>22</sup> thought that when the aortic orifice was greatly narrowed, rapidly developing heart failure, by still further retarding the blood flow through the minute opening, might induce an acute myocardial ischemia analogous to that following coronary artery thrombosis and give rise to identical symptoms.

Harrison, quoted by Contratto and Levine,<sup>16</sup> believed that the angina might be due to relative anoxia. The work done by the heart demands more oxygen than the coronary blood flow can provide. The intraventricular pressure must be enormously increased because of aortic stenosis. The velocity factor, which under usual conditions has relatively little to do with cardiac work, may become the greatest factor in aortic stenosis, when with a markedly narrowed orifice the rate of flow must be enormously greater during systole. Angina may also be due to slight vasomotor changes in the caliber of the normal coronary vessels often found in cases of calcific aortic stenosis in young people. This may account for the less frequent relation of exercise to pain than in the ordinary coronary stenosis cases with angina pectoris. Contratto and Levine suggested a suction-pump action of the aortic blood stream with its increased velocity on the orifices of the coronary arteries which leave at right angles, this possibly diminishes the coronary blood flow and leads to a relative myocardial ischemia.

### DIAGNOSIS

#### *Symptoms*

The diagnosis of calcific aortic stenosis can only rarely be made on the basis of subjective findings. The heart is apparently able to compensate well for the change in dynamics caused by aortic stenosis. The relatively few subjective symptoms, coupled with general lack of awareness of this entity, have in the past led to errors in diagnosis of this form of valvular disease. In one series of 42 cases<sup>20</sup> only 6 had cardiac complaints. In another series of 236 cases<sup>17</sup> only a third were diagnosed *ante mortem*.

The chief complaints are usually those associated with angina pectoris, left ventricular failure (cardiac asthma), syncope, Adams-Stokes syndrome or congestive heart failure.

**Angina Pectoris** The symptoms of angina pectoris are found in a varying but considerable percentage of patients with calcific aortic stenosis. McGinn and White<sup>17</sup> reported that 19 per cent of 236 patients had angina pectoris. Margolis et al.<sup>9</sup>

reported 42 cases, 4 having angina pectoris. Contratto and Levine<sup>16</sup> reported 41, or 23 per cent, of 180 cases as having well-defined angina pectoris. Boas<sup>22</sup> reported 4 of his 19 cases as having classic angina pectoris. In all these cases a relative myocardial ischemia was the apparent cause.

**Left Ventricular Failure** Either a sudden or gradual failure of the left ventricle causes dyspnea, so-called "cardiac asthma," due to the diminished blood flow with congestion in the lungs. Although this manifestation is relatively rare, it should arouse suspicion of the presence of calcific aortic stenosis, particularly in the older age groups.

**Syncope and Sudden Death** Among the earliest cases of calcific aortic stenosis in the literature are found those with syncope and sudden death. Marvin and Sullivan<sup>26</sup> reviewed this literature, and pointed out that sudden death may occur in aortic stenosis as well as in the more widely recognized conditions of coronary thrombosis, anginal heart failure, atrioventricular block and syphilitic aortitis with aortic insufficiency. They believed the syncope to be due to overactive carotid-sinus reflex. This hypothesis does not find corroboration in the results of other investigators.<sup>16</sup>

**Adams-Stokes Syndrome** Typical Adams-Stokes attacks may occur in the course of calcific aortic stenosis. Their presence should be looked for when this diagnosis is under consideration. The attacks are apparently caused by the relative cerebral anemia due to the slow ventricular rate, or actual temporary cardiac asystole.

**Congestive Heart Failure** The slow progressive nature of the lesion in calcific aortic stenosis produces symptoms of congestive heart failure relatively late in the course of the disease.

## Signs

**Blood Pressure** A review of the data on blood-pressure readings reveals that when no complicating factors are present calcific aortic stenosis produces a systolic pressure which is likely to be low and a diastolic pressure which is apt to be slightly elevated, resulting in a small pulse pressure. Other factors which influence the height of the blood pressure are associated essential hypertension and, more often, aortic insufficiency. In 180 cases reported by Contratto and Levine<sup>16</sup> an average systolic pressure of 145 and diastolic pressure of 84 were noted. The range of the systolic pressures was from 260 to 80, while the diastolic pressures varied from 156 to 10.

**Pulse** The pulse is characteristically small, of a plateau type and not infrequently slow. It has been described as anacrotic or bisferious.

**Murmurs** There is a characteristic long, loud,

rough systolic murmur, either localized in the aortic area or, as often occurs, transmitted to the vessels of the neck. The diastolic murmur of a complicating aortic insufficiency is occasionally present. An Austin-Flint murmur may rarely be heard. In the interpretation of heart sounds it must be borne in mind that murmurs heard over the aortic or pulmonic areas do not necessarily arise from the corresponding valve.

**Second Aortic Sound** Owing to the adynamic aortic cusps found in calcific aortic stenosis, the second aortic sound is frequently of diminished intensity and may be entirely absent.

**Thrill** A systolic thrill over the aortic area is often found in calcific aortic stenosis. However, it is not consistently present and must not be insisted on before the diagnosis is made. In one series of 51 cases of aortic stenosis that came to necropsy a thrill had been found in only 21.<sup>17</sup>

**Enlargement of the Heart** As a result of the obstruction to the free passage of blood through the aortic orifice because of calcific aortic stenosis, it has been shown<sup>13</sup> both clinically and experimentally that the heart undergoes a gradual hypertrophy which is preceded by a stage of initial dilatation. In cases of long standing a markedly enlarged heart is the usual finding. Chevers<sup>29</sup> pointed out as long ago as 1842 that a morbid narrowing of the aortic orifice caused cardiac hypertrophy even in the presence of a completely obliterated pericardium.

**Electrocardiogram** Defects in conduction are commonly found in electrocardiograms. These include typical cases of bundle-branch block, increased P-R intervals and cases of complete heart block. Recently it has also been shown<sup>22</sup> that ischemia of the myocardium in calcific aortic stenosis, which may be further increased by a slow ventricular rate, produces electrocardiographic changes indistinguishable from those characterizing thrombosis of the coronary artery. Boas<sup>22</sup> pointed out an anatomical basis for conduction defects in cases with calcific aortic stenosis. Master, Jaffe and Dack<sup>30</sup> recently reported an electrocardiogram which could not be differentiated from that encountered in coronary thrombosis.

**X-ray and Fluoroscopy** Sosman and Wosika<sup>27</sup> reported 23 cases and concluded that roentgen ray visualization, roentgenoscopically and roentgenographically, of calcified heart valves during life was possible with present-day roentgen apparatus. With the proper technique<sup>25, 27</sup> the calcified valve can be seen to produce small dense shadows, rapidly moving or dancing up and down. They can not be projected outside the cardiac shadow and

are not affected by deep inspiration. It appears that they are best seen in the right oblique view in the median line, or a little to the right of it in the lowest third of the cardiac area.

### Course

The slow, progressive nature of the pathologic process similarly produces a prolonged clinical course. Symptoms do not appear until relatively late in the disease. When these have once made their appearance the subsequent course is usually brief. Thus, cardiac failure and often sudden death may be looked for. A life expectancy of about one year is the usual outlook when symptoms of congestive heart failure are noted.

### TREATMENT

The therapy of aortic stenosis prior to the advent of symptoms of congestive heart failure must be aimed at restricting the patient's activities and instituting a highly individualized regime in order to avoid unnecessary overwork of the heart.

When congestive heart failure makes its appearance it must be treated as failure due to any other type of lesion.

### CONCLUSIONS

Calcific aortic stenosis is becoming more and more often recognized. The possibility of its presence in an aortic lesion when no mitral lesion is present should be borne in mind.

The condition is not uncommonly followed by sudden death, and Adams-Stokes attacks may occur.

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## REPORT ON MEDICAL PROGRESS

## THORACIC SURGERY

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BOSTON

## ANESTHESIA

IN THORACIC as in general surgery, there exists no unanimity regarding the choice of the anesthetic agent or the technic of administration. Local anesthesia for extensive operations on the chest wall or lungs has never been widely used in this country but remains the method of choice for the less extensive operations of drainage for empyema or lung abscess. Cyclopropane and oxygen has come into vogue in recent years, and in many clinics is considered indispensable for chest surgery. Certainly this mixture is preferable to nitrous oxide and oxygen because of its higher content of oxygen. However, the circulatory apparatus is under a severe strain in many chest operations, and the toxic effects of cyclopropane on the heart have not been tested by experience.

An ether vapor and oxygen mixture is, theoretically at least, even more ideal than cyclopropane in preventing anoxemia, as the oxygen content may be raised to almost 100 per cent. The reviewer has for several years been on the alert for any evidence that warm ether vapor mixed with oxygen and properly administered possesses irritating qualities deleterious to the lungs or air passages. It has been used as the anesthetic of election in hundreds of cases of thoracic disease, including acute tuberculosis. It has been compared with avertin, cyclopropane, barbiturate sedation and other agents singly and in combination. No evidence has been found that ether possesses undesirable qualities for use in chest cases, and unless special circumstances exist it is considered preferable to any other existing anesthetic. The prejudice against ether found its origin in the days of cone administration when patients were permitted to gurgle in their secretions in a state of sublethal asphyxia.

Experienced thoracic surgeons insist on differential-pressure anesthesia for operations in the free pleural cavity, although they are ready to admit that many patients will survive such an operation without it. Tracheal intubation has largely replaced the tightly fitting mask in the technic of administration. For differential pressure alone, a tube entering the larynx via the nose is sufficient, if purulent secretions are plentiful, as in bronchiec-

tasis, a large Flagg tube is employed so that aspiration can be carried on. In some clinics (Rienhoff, Ochsner) intubation of the trachea is avoided on the ground that infection may be introduced.

## BRONCHOGRAPHY

Roentgen-ray demonstration of the bronchial tree by the injection of opaque solutions into the respiratory tract is an established and exceedingly valuable procedure. If carefully done by an expert untoward results are rarely encountered. The value of the demonstrations as a preoperative study for the visualization of pathologic lesions transcends its use in pure diagnosis.

The use of bronchography should not be considered comparable to that of contrast mediums in the study of the gastrointestinal tract. In general it requires a more exacting technic, and if used incorrectly the oil may be retained in the parenchyma of the lung and obscure later pathologic developments.

The chief use of bronchography has been found in bronchiectasis, where the pattern of the disease may be completely outlined and the feasibility of surgery determined. It is rarely employed in lung abscess, tumors of the lung or pulmonary tuberculosis. It should never be used routinely as a method of studying an unselected group of patients with thoracic disease.

Many methods of injection have been elaborated. Catheterization of the trachea through the cannalized larynx seems to afford the most precise control of the distribution of oil and the best control of the position of the patient for accompanying roentgen ray studies. For detailed problems a special catheter may be inserted into individual bronchial segments and a record made by spot films under fluoroscopic guidance (Thompson, Goldman and Adams).

Bronchography by the injection of oil with the bronchoscope in place tends to give disappointing results. If it seems necessary to combine the two procedures, injection of oil should be done after the bronchoscope is withdrawn and the cough reflex has subsided.

The roentgenographic technic of bronchography must be systematic and thorough. A unilateral injection is first made and recorded by anteroposterior and lateral films. Following injection of the sec-

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ond side, anteroposterior and oblique films are required. A great majority of the records made by those unexperienced in the procedure are worthless, as they yield only incomplete evidence and require repetition in the hands of an expert team.

#### BRONCHOSCOPY

The bronchoscope is as important in the diagnosis of chest disease as the proctoscope is in the study of the large bowel and rectum. In expert hands it is usually no more disturbing to the patient. In interpreting the findings of a bronchoscopy, however, the instrument's range of vision must be kept clearly in mind. This is limited essentially to the orifices of the first subdivisions of the lobar bronchi. With the aid of the fluoroscopic table foreign bodies may be recovered from more remote regions of the lung. The aspirating cannula may be inserted into the fine subdivisions. Visualization of pathologic lesions, however, and precise biopsies are possible only in the limited area designated.

Precision in the use of the bronchoscope is furthered by a complete preliminary study of the case. Exploratory bronchoscopy should be as unusual an event as exploratory laparotomy. Adequate fluoroscopic and roentgen-ray study usually results in requesting the bronchoscopist "to take a biopsy from the mass presenting in the first dorsal division of the left lower lobe bronchus" rather than merely asking him what he can see.

Barring the extraction of foreign bodies, the therapeutic potentialities of the bronchoscope are not so impressive as is its value in diagnosis. Its efficacy in the treatment of acute lung abscess is still questioned outside Philadelphia. The results in bronchiectasis are palliative, and only occasionally better than those attained with postural drainage. As an intensive preoperative measure the procedure may be helpful in building up the general condition of the patient. Small benign tumors may be removed successfully by the bronchoscopist, and areas of lung drowned in retained bronchial secretions drained by removing the obstruction due to larger tumors. Cicatricial stenosis may be dilated in some cases, with relief of symptoms.

The significance of a negative bronchoscopy in primary carcinoma of the lung depends entirely on the location of the tumor. Failure to obtain a positive biopsy when obstruction to a lobar bronchus has been demonstrated by x-ray is important evidence against carcinoma. Failure to reach a peripheral tumor is to be expected, and in fact, under these circumstances, bronchoscopy may not be advised.

The location of an area of suppuration may be designated by observing pus exuding from a bron-

chial orifice. The source of a positive tuberculous sputum may be determined if aspirated secretion from one lung is constantly negative and that from the opposite lung positive.

The clinical importance of tracheobronchial lesions has led to a more frequent use of the bronchoscope in tuberculosis. The ulcerative and stenosing lesions of this complication have an important bearing on the results of and the indications for collapse therapy.

#### EMPHYEMA

During the influenza epidemic of 1918, high-pressure publicity was given to the intercostal-catheter method of drainage for acute empyema. In succeeding years the method was modified and amplified by an untold number of devices for the maintenance of negative pressure and the flow of irrigating solutions. As more emphasis has been placed on the principles of the treatment of empyema rather than on the details (Heuer, Graham), the enthusiasm for the rediscovery of complicated methods has calmed down.

The catheter method of intercostal drainage is a lifesaving measure under certain circumstances, it is also a very effective form of treatment for a large number of cases in infancy and childhood. In general, however, it is more difficult to carry out and leads to more complications in inexperienced hands than does needle aspiration, followed by rib resection when the pus has thickened. The important principle to bear in mind is not to create a pneumothorax by any method in a patient who has a reduced respiratory reserve. Early in the 1918 influenza epidemic this was done by resecting a rib during the acute phase of streptococcal bronchopneumonia, and disaster naturally followed.

In the community at large there seems to be more difficulty arising from taking out the drainage tubes prematurely than from putting them in. In this regard it is emphasized that a tube should not be removed until the cavity has become obliterated. The most effective calibration of an empyema cavity is made by the injection of Lipiodol under fluoroscopic guidance.

Specific immunological measures may well lessen the incidence of empyema both in streptococcal and pneumococcal infections. There are already encouraging signs pointing in this direction.

#### LUNG ABSCESS

Putrid lung abscess remains one of the most destructive forms of thoracic disease and one of the most difficult therapeutic problems. A wave of animal experimentation seeking to throw light

on the pathogenesis of the disease swept over the country a few years ago. This has now subsided, leaving the conclusion that abscesses can be produced either by infected vascular emboli or by infection via the bronchial route. The majority of clinicians hold to the aspiration theory.

Because of the fact that approximately 20 per cent of all cases may be expected to heal spontaneously, there is still a tendency to prolong the period of expectant treatment to an illogical degree. Neuhof has recently been a strenuous advocate of "early operation." As a warning against dangerous delay his advice is sound. It has long been known that spontaneous healing rarely occurs unless definite signs of regression are observed during the first six weeks. Many surgeons still believe that at least this period should elapse in a majority of cases before operation is performed. This pause serves not only to allow spontaneous healing to take place but to permit subsidence of the concomitant pneumonitis. It is not clear from Neuhof's writings whether operation at the end of six weeks falls within his definition of "early."

Neuhof has also urged operation in one stage. The safety of this procedure is questioned by a number of surgeons experienced in the field, and he stands almost alone in making this recommendation. Aside from the dangers of contaminating the pleural space, a great deal is gained by the protection against infection of the chest wall which is afforded by the two-stage procedure.

Drainage of an abscess by no means ends the story in many cases. Sequestration of the lung commonly results in a defect that resists the processes of natural healing. In a few borderline cases the defect may be closed by turning a pedicle muscle graft into the cavity. The healing of residual apical cavities may be aided by thoracoplasty. It is becoming increasingly clear that the large defects must be treated by lobectomy or pneumonectomy if permanent healing is to be expected.

Certain cases of lung abscess in the subacute or chronic stage (two months and longer) present indications for primary lobectomy. A consideration of this method is particularly recommended in abscesses of the upper lobe, as they are notoriously difficult to drain adequately and are resistant in healing.

The Philadelphia group continues to report favorable results in the treatment of lung abscess by bronchoscopic aspiration. Success appears to depend on instituting treatment very early after onset. If improvement is not soon manifest or if the abscess recurs after a remission, recourse is had to surgical drainage.

A good deal of the confusion that exists re-

garding the therapy of lung abscess may be traced to variations in the clinical material of various institutions. An enthusiastic report (Nammack and Tiber) regarding the efficacy of guaiacol recently emanated from Bellevue Hospital. Careful study of the individual case reports shows that a predominant number of cases were what might be classified in other hospitals as septic pneumonitis from the aspiration of pharyngeal secretions or gastric contents during an alcoholic debauch. These cases are common in large municipal hospitals receiving admissions from the police ambulance service. Their clinical course is quite different from that of the putrid post-tonsillectomy abscess.

As a preventive measure, tonsillectomy and other operations in the nasopharyngeal region must be regarded as serious affairs, particularly in the adult patient. In elective procedures, oral hygienic measures should be undertaken as a preliminary step. Every effort should be made to minimize the extent of denuded areas that must heal by granulation attended by suppuration.

#### PULMONARY TUBERCULOSIS

The consultation services of a thoracic surgeon are now indispensable in any institution housing patients with pulmonary tuberculosis. Certain states (Connecticut and New York) have developed comprehensive programs that combine their several institutions in a unified surgical service. In Massachusetts the two state institutions are served by one consultant, and the eight county sanatoriums by at least four other consultants experienced in chest surgery.

Extrapleural thoracoplasty has become increasingly effective as the technic of its performance has been perfected. The principle of extrafascial apicolysis introduced by Semb, of Oslo, has been accepted in most clinics and is used as a routine adjunct to the removal of ribs. This procedure drops the apex of the pleura to the level of the fifth rib. Combined with the resection of long segments of the upper ribs, extrafascial apicolysis is so effective that thoracoplasty for upper lobe disease is rarely carried below the seventh rib.

A revival of extrapleural pneumothorax is well on its way. When intrapleural pneumothorax is impossible because of adhesions, the parietal pleura may be stripped from the chest wall and the space so created maintained by refills of air. It seems wise at the present to reserve this procedure for use in patients in whom thoracoplasty is certainly contraindicated. While very ill patients withstand the operation surprisingly well, it should not be considered a substitute for thoracoplasty on the grounds that it is a less disturbing procedure. In many cases thoracoplasty to close the space will

have to be performed at a later date, and when the mortality of late complications is included, it may be safely predicted that the risk of the procedure will be found greatly to exceed that of thoracoplasty. There are certain cases, however, in which it is being carried out as the only possible effective measure.

Phrenic nerve surgery has suffered a recession in popularity, at least east of the Hudson River. Permanent paralysis of the nerve is rarely performed, and temporary paralysis is carried out with far less frequency than a few years ago. The procedure has been found to be relatively ineffective, and what is more important, actually to increase the risk of a subsequent thoracoplasty. There are still distinct indications, however, for its use in carefully selected cases.

Bilateral thoracoplasty has on the whole been found disappointing. The removal of sufficient ribs to arrest the disease effectively is apt to leave the patient a respiratory cripple.

The goal of collapse therapy is a negative sputum, and laboratories have met this challenge by refinements in sputum examination extending through concentration methods to cultures and guinea-pig inoculations. Examination of the gastric contents is the final step when the patient no longer raises sputum. While these efforts are laudable and increase the understanding of the disease, it is difficult at the moment to know what they mean from a practical prognostic standpoint. Certainly many cases formerly classified as arrested by any form of treatment would now be found to be carriers of the tubercle bacillus.

#### BRONCHIECTASIS

Extirpation of the diseased areas of lung has long been the goal of those familiar with the pathology of bronchiectasis. Early efforts in lobectomy were attended with an operative mortality rate that was prohibitive. Attempts were then made to find a substitute, and collapse therapy by pneumothorax or thoracoplasty (Hedblom), cautery pneumonectomy (Graham), and exteriorization lobectomy (Whittemore) had their day. In 1926, Brunn revived the direct surgical attack. Shortly thereafter Shenstone devised the ingenious snare tourniquet that simplified the technical problems of dealing with the hilar stump. The development of bronchography made it possible to outline the pattern of the disease so that a systematic surgical program could be planned. The net result of these and other aids to diagnosis and technics has been a reduction in the operative risk of lobectomy from 50 per cent to less than 5 per cent. Surgery is now routinely recommended even in the milder cases of the disease.

An area of lung which is the site of established

bronchiectasis must be regarded as irreparably damaged. No evidence exists that the pathologic lesion is a reversible one. The symptoms are notoriously variable in the same individual at different seasons of the year or at different periods in the course of the disease. In general, the initial insult to the lung structure occurs early in life and is of varied origin. The basic element in the pathology is a destruction of the ability of an area of the bronchial tree to rid itself of the secretions of the mucous membrane. The dilatations may remain "dry" and cause no symptoms for periods of years. Sooner or later, however, infection occurs and cough and sputum manifest themselves. Infection, favored by stagnation, leads to the characteristic odor from decomposing secretions. Hemorrhages result from ulcerations of the bronchial mucosa, and are infrequent when long-standing infection has erected a barrier of peribronchial fibrous tissue. In fact, hemoptysis is more apt to occur in the "dry" phase of the disease.

Established infection increases the tendency toward stagnation of secretions by hypertrophic changes of the mucous membrane. Acute episodes of pneumonitis spreading from the focus of the disease recur with increasing frequency. Pleurisy and empyema appear as complications. The accessory nasal sinuses quite commonly become infected and serve as an additional focus for the perpetuation of an endless series of respiratory tract infections, particularly during the winter months.

The progressive course of the symptoms has led to the conception that bronchiectasis is a progressive infection of the lung. As a matter of fact, the anatomic pattern of the disease is usually complete at the time the diagnosis is first made. Patients may progress to advanced stages of the disease with the production of a copious volume of malodorous sputum and still show a sharply localized lesion in one lobe or even a single portion of a lobe. Involvement of other areas of lung does occur, but usually as the result of an episode of acute infection. Other areas of lung become damaged by fibrosis and emphysema as a sequel to focal areas of pneumonitis or bronchitis.

A concept of the underlying pathology of the disease is essential to an understanding of its treatment. Conservative measures such as postural drainage, bronchoscopic drainage, local treatment of nasal sinusitis, vaccines, change of climate and sanatorium regimen may be classified as symptomatic treatment. Certain of these measures are to be employed when contraindication to operation is present, or may be useful to prepare the patient for operation. Curative treatment resides only in surgical extirpation of the diseased area of lung.

Certain bilateral cases have been made the sub-

jects of bilateral lobectomy. These cases require careful selection and accurate appraisal of the lung tissue that is to remain. They will always constitute a small group so far as surgery is concerned.

While the ideal case for operation presents a localization of the disease to a single lobe, technical methods are being developed to deal with foci of bronchiectasis scattered throughout several lobes. In cases coming to operation before the dense scarring of chronic infection offers a barrier, segmental resection of diseased areas with conservation of normal lung substance may be possible (Churchill).

Cases of bronchiectasis or cystic disease involving an entire lung may be cured by total pneumonectomy. In the presence of active infection this becomes one of the most formidable operations of thoracic surgery and carries a correspondingly high risk, approximately 35 per cent. The chief hazard lies in uncontrolled hemorrhage from the vascular adhesions that fuse the lung with the chest wall. A second hazard lies in the post-operative infection of the pleural space, mediastinum and chest wall. Amputation of the hilus usually requires use of the tourniquet technic rather than individual ligation of the vessels as in primary carcinoma.

The appraisal of the possibilities of surgery in bronchiectasis centers about a precisely done and complete bronchogram. Disappointing results will follow a failure to delineate completely the pattern of the disease before embarking on a surgical program.

#### PRIMARY TUMORS OF THE LUNG

The most outstanding achievement in the field of chest disease during the past decade has been the extension of knowledge concerning primary tumors of the lung. Internists, radiologists, surgeons and pathologists have found the subject a productive field for their best efforts, and the accumulated literature has assumed vast proportions.

The most spectacular operation of thoracic surgery—total pneumonectomy—has emerged as the answer of the surgeon to the challenge of hopeless malignant disease. It is now a little more than five years since the first successful removal of an entire lung for epidermoid carcinoma (Graham). Although the vast majority of cases reach the surgeon at a time when the possibility of arresting the disease by extirpation has passed, sufficient experience has been accumulated to demonstrate the feasibility of the procedure from a technical standpoint.

The operative risk of total pneumonectomy is high. Statistics dealing with operative mortality

are at the present time so colored by variations in the criteria of operability, as well as variations in the technics employed, that an estimate, if given conservatively, is of more significance than a thorough analysis of reported cases. As a conservative estimate, it may be stated that the hospital mortality for total pneumonectomy in the absence of a preoperative element of infection is leveling off at about 20 per cent, with infection, at between 35 and 50 per cent.

Statistical evidence regarding the frequency with which the surgeon is able to arrest carcinoma of the lung will not be available for many years. Certainly there is no reason to believe that surgery will be more or less efficacious in dealing with pulmonary carcinoma than it has been, it might be said, with carcinoma of the stomach. While enthusiasm is being centered about patients surviving the operation, it must not be forgotten that the operation is being undertaken for cancer.

Total pneumonectomy may be carried out by individual ligation of the vessels and careful suture of the main bronchus unless an inflammatory barrier makes dissection within the mediastinum impossible. In the latter event, tourniquet amputation becomes necessary. In the absence of gross contamination from an infected lung (pneumonia, obstructive endobronchial suppuration and even actual abscess formation are frequent concomitants of pulmonary neoplasms), the pleural cavity may be closed without drainage and healing by first intention secured. If infection of the pleural space ensues, drainage is employed and a thoracoplasty to obliterate the unilateral empyema cavity performed at a later date.

The pendulum has swung to the extreme point of view in regard to total pneumonectomy as the only operation for primary carcinoma of the lung. It is the ideal operation in the sense that it offers a more complete eradication of the primary growth and adjacent lymph nodes than any more limited procedure. It will be required in a majority of cases by reason of the anatomic site of the primary growth. It is not the ideal operation, however, if patients without lymph-node involvement are going to be sacrificed because of the high operative risk that it entails. The prospects of cure of any cancer are relatively so poor, once regional metastases have taken place, that an effort routinely to extirpate regional lymph nodes at a high price in operative mortality seems of doubtful wisdom. For this reason, lobectomy, if the primary growth and any demonstrably involved lymph nodes can be removed thereby, should still find a place in the treatment of lung tumors.

A positive preoperative diagnosis materially

strengthens the hand of the surgeon in assuming such a serious responsibility. This may be obtained by bronchoscopic biopsy in approximately 70 per cent of all cases, but in a smaller percentage of the operable group. The latter will include a relatively large number of peripheral tumors that cannot be reached with the bronchoscope. In many cases, therefore, operation must be advised and carried out in the absence of a preliminary microscopic diagnosis. Expert roentgen-ray technic and interpretation is essential under these circumstances.

A primary tumor arising in the bronchial wall and superficially resembling bronchogenic carcinoma has been variously referred to as "benign adenoma" or "carcinoid." Whatever the histogenesis and nature of this tumor are ultimately proved to be, clinically and prognostically it differs sharply from carcinoma. Invasion is extremely slow and limited in extent, and metastasis is extraordinarily rare. Many such tumors, however, require radical extirpation because of the damage done to the lung by long-standing bronchial obstruction and infection.

Unfortunately, these tumors are still being confused with cancer, and inclusion of them in end-result studies gives a distorted picture of both operative mortality and ultimate survival. These tumors are observed with a frequency of 1 to 10 true carcinomas. Of the group of resectable bronchogenic tumors, however, they comprise 25 per cent in the Massachusetts General Hospital series (8 adenomas to 24 resectable primary bronchogenic carcinomas).

Whether or not this tumor is potentially malignant, its inclusion in statistics purporting to deal with cancer will give rise to undue optimism in the interpretation of results. If for no other reason, the adoption of the classification suggested by Womack and Graham must be accepted with caution.

#### HEART AND GREAT VESSELS

The most spectacular achievement of the decade in the surgery of the heart and great vessels has been the successful closure of a patent ductus arteriosus in 4 cases by Gross. Without detracting from the brilliant achievement of the surgeon, our compliments must be extended to the internist, Hubbard, who had courage to recommend the operation to his patient. Many of the "firsts" in surgery await the conjunction of an internist with imagination, a surgeon with courage and skill and, last but not least, a willing patient.

Attempts to provide an artificially produced collateral circulation to the myocardium in cases of insufficient coronary circulation have been made

by Beck in this country and O'Shaughnessy in London. Beck has utilized the muscles of the anterior chest wall, and O'Shaughnessy the omentum fixed in contact with the surface of the heart. Painstaking experimental observations on animals have served as a basis for the clinical experiment. Encouraging results are claimed by both workers.

Successful suture of wounds of the heart is now commonplace in the South. Elkin of Atlanta and Bigger of Richmond have materially added to the clinical diagnosis and operative technics of cardiac suture.

Decortication of the heart for constrictive pericarditis (Pick's disease) has become firmly established as a therapeutic procedure. Additional light on the disturbed mechanics of the circulation has been provided by the observations of Burwell and his co-workers on cardiac output before and after operation. White believes that the syndrome is rarely if ever of rheumatic origin. Tuberculosis seems the most probable etiology in a majority of cases but can rarely be proved by direct evidence.

#### ESOPHAGUS

The time is ripe for a more determined surgical attack on carcinoma of the esophagus. Irradiation has been shown to destroy the tumor in certain cases, but leaves a legacy of fibrosis which perpetuates the obstruction. Sporadic success with surgical extirpation has been reported over a period of years, but many technical problems require a more extensive experience for their solution. In an early case surgery should be considered the procedure of choice.

Perforation of the cervical esophagus has been labeled a surgical emergency by Pearse. He recommends immediate exteriorization of the perforation by a cervical incision and packing. Mediastinotomy, he says, may be advisable in perforations below the fourth thoracic vertebra.

A controversy still rages between the proponents of a two-stage and a single-stage operation for the common pharyngeal or pulsion diverticulum. Lahey favors the two-stage procedure, whereas Shallow reports a large series of cases done by the single-stage method. There is no generally accepted answer at present.

#### MEDIASTINUM

The mediastinum has established a reputation as the domicile of large rounded tumors which stimulate a guessing game in preoperative diagnosis. In general, the neurogenic tumors neurofibroma and ganglioneuroma, tend to be situated posteriorly, and the teratomas and dermoid cysts anteriorly.

Intensive irradiation of these tumors in the absence of a definite diagnosis is to be heartily condemned. In certain cases it may be advisable to give a "lymphoma" dosage as a diagnostic measure. If the tumor regresses it is obviously not one that should be treated surgically, if it does not respond to light irradiation, surgical exploration to determine its nature and remove it if possible is indicated. Excellent results are obtainable in the group of benign tumors and cysts.

#### DIAPHRAGM

The thoracic approach is commonly recommended for the repair of rupture of the diaphragm—a not infrequent result of severe trauma. Rupture of the diaphragm with displacement of abdominal viscera into the pleural cavity is to be differentiated from hernia through an anatomic hiatus. Hernia through the esophageal hiatus is observed quite commonly by radiologists, but only rarely can be fixed on as the cause of symptoms. This lesion may be repaired by the abdominal approach. Harrington has presented a carefully considered anatomic repair of this defect and cites his experience with a large series of cases. Surgical repair of eventration of the diaphragm has not been reported, and presents a difficult problem.

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CASE RECORDS OF THE  
MASSACHUSETTS GENERAL HOSPITALANTHEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25241

## PRESENTATION OF CASE

*First Admission* A sixteen-year-old girl was admitted complaining of pain in the right knee.

For the past four months she had had a dull aching pain in the right knee made worse on walking. During the last two months she had been unable to flex or extend completely the knee. There was no pain at night if she lay on her back holding the right knee sideways, lying on her face caused pain. The knee gradually became swollen, more so at night. The pain and swelling slowly became worse, and one month before admission it became constant. During the previous two months the right ankle became slightly swollen and painful at night. There was no history of injury, locking, inflammation, fever, night sweats or pain elsewhere. Her past and family histories were noncontributory.

Physical examination showed a well-developed and nourished girl in no acute distress. Examination of the heart revealed a loud blowing systolic murmur loudest over the pulmonary area. The blood pressure was 140 systolic, 85 diastolic. The patient walked with a limp, holding the right knee at about 20° of flexion. The right knee was somewhat swollen, and the right leg above the knee was slightly wasted. Moderate tenderness was present over a somewhat firm swelling along the anterior edge of the tibia just below the patella.

The temperature was 98.6°F., the pulse 80, and the respirations 20.

Examination of the urine was negative. The blood showed a red-cell count of 5,000,000 with 80 per cent hemoglobin, and a white-cell count of 14,400 with 68 per cent polymorphonuclears. A blood Hinton test was negative. Tuberculin tests in dilutions of 1:5000 and 1:1000 were negative. The blood serum calcium was 10.93 mg per 100 cc., the phosphorus 4.64 mg, and the phosphatase 2.86 Bodansky units.

X-ray films showed a large area of diminished density involving the central portion of the head of the right tibia. There was marked thinning of the cortex, the process extending to the articular cartilage. The area was trabeculated. The lower border was somewhat irregular. There was very little evidence of expansion, the cortex being in-

tact. The lower femur showed some diminished radiance probably due to atrophy. Films of numerous other bones showed no evidence of disease. The chest was negative.

On the eighth hospital day operation showed a typical giant-cell tumor which was shelled out, and the cavity curetted. The upper end of the normal shaft of the tibia was then chiseled obliquely and the cavity filled with periosteum and soft parts. A tongue-shaped flap of periosteum was allowed to drop back into the cavity. The pathological report on the tumor was benign giant-cell tumor. The patient rapidly recovered and was discharged on the twenty-ninth hospital day.

*Second Admission* (four years later) Following discharge the patient remained perfectly well until eight weeks before re-admission when, without trauma or other known exciting cause, she began having dull intermittent pain in and just below the right knee. It gradually became more or less continuous, especially at night. Three or four weeks before entry the pain became so severe that she was forced to give up her work in a shoe factory. She began using a cane. The knee then began to assume a permanently flexed position. Swelling then occurred in the region of the old operative incision and increased until it involved the entire lower leg when the leg was kept in a dependent position. The pain then became quite localized to the area beneath the operative incision. The appearance of the skin did not change. During the previous two weeks she had used crutches. There was no pain elsewhere, and no fever or malaise. She had lost about five pounds in weight in the past three months.

Physical examination was negative except for the right leg. Over the medial aspect of the proximal end of the right tibia there was a dome-shaped mass 7 cm in diameter and 2 to 3 cm high, which felt tense and slightly fluctuant in its midportion. There was a healed scar overlying it. It was apparently fixed to the underlying structures and to the tibia. The skin surface was possibly slightly warmer than that of the opposite leg. The mass was slightly tender throughout, but especially so in the anterior portion. There was no evidence of increased fluid in the joint. The inguinal lymph nodes were not enlarged. The right calf and thigh showed evidence of atrophy.

The temperature was 97.8°F., the pulse 88, and the respirations 20.

The urine examination was negative. The blood showed a red-cell count of 5,600,000, and a white-cell count of 10,720 with 84 per cent polymorphonuclears. A blood Hinton test was negative. The serum calcium was 10.77 mg per 100 cc., the phosphorus 3.6 mg, and the phosphatase 4.24 units.

X-ray films showed an area of diminished density in the extreme upper end of the right tibia with rather ill-defined margins and measuring 4 cm in diameter. In the central portion of this area the trabeculae were increased in density and were rather mottled in appearance. The bone surrounding the area was dense and sclerotic. There had been a considerable amount of new-bone formation in the operative area medially. There was slight tilting of the joint surface of the tibia toward the medial side.

On the fourth hospital day an operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR CHARLES C LUND \* This is the type of case where the x-ray is of special importance in making a diagnosis. I wonder if we could see the films now.

DR TRACY B MALLORY The x-rays on the first admission are not available. They have been sent to the Bone Registry, but no one who has seen them questions the statement that the picture is entirely typical of a benign giant-cell tumor. Dr Schatzki will show you the subsequent films.

DR RICHARD SCHATZKI The first film is a postoperative film and shows the location of the lesion and the postoperative defect.

DR LUND At the first admission?

DR SCHATZKI Yes, in 1934.

DR LUND The triangular-shaped defect is at the upper end of the tibia on the medial side and measures about 5 by 5 by 5 cm. It leaves a lateral margin of the tibia that is a little bit wider than the fibula.

DR SCHATZKI Four years later there is marked regeneration of bone in the area of operation. A cavity-like defect is seen in the midportion of the condyles of the tibia which apparently was present at operation and represents the area of the original tumor. The appearance of this cavity has, however, changed. There are small chip-like areas of new-bone formation in this region. The soft-tissue mass described in the report extends over the upper edge of the cavity along the medial aspect of the tibia and shows nothing but a homogeneous soft-tissue shadow.

DR LUND Going now to the postoperative film there is complete removal of this triangular area of bone. Looking closely in connection with what has developed since, one sees that the epiphyseal region is denser than the area on the other side and does not look as though there had been complete removal of any process that may have been there. It looks to me as if there possibly had been only partial removal of diseased bone in that

part, but of course I cannot be sure of that. In the recent film one sees filling in this area of increased radiance, an irregular area of increased density, and in addition a definite soft-part tumor medially, with a little break in the somewhat irregular contour of the healed bone.

In the early part of this century, I think probably largely due to some of Dr E. A. Codman's work, a clear distinction between the various primary tumors of the bone began to be made and people started to realize what had not been appreciated in the latter part of the last century, namely, that the group of bone tumors with foreign-body giant cells scattered through the tumor tissue were not in any way like the osteogenic type of tumor. A great many amputations had been done in the past for cases that were not very malignant. When I was a student and intern — which is now going on to twenty years ago — we were taught that the giant-cell tumor was not malignant. But shortly after that, due to further work by Dr Codman and particularly presented in a paper by Dr Simmons,<sup>1</sup> that was shown to be untrue. There are cases of giant-cell tumor that without changing their pathologic character have the ability to metastasize and there are cases of apparently very definite giant-cell tumor that shift over into what may be called osteogenic tumors. With that background we have to consider whether in this case the process that was present on re-entry was a recurrence of a giant-cell tumor, whether it was a development of an osteogenic type of tumor in the presence of what was originally a giant-cell tumor, or whether it was something else entirely different. This soft-part tumor bothers me a great deal because I should not expect a mass of that size with no calcification in connection with either of the two types of process that I have just described. Moreover this was described as a semi-fluctuant mass, which makes one think of infection. There is no other evidence pointing in that direction, however. The temperature was not raised, and the white-blood-cell count not elevated, and a remote infection at this late date, four years after operation, can be quite well ruled out. Finally, I think it would be unreasonable to consider here any process totally unconnected with the original one, such as metastatic malignancy or a new disease.

Just a word more and then I shall make an attempt at a diagnosis. Of course the clinical diagnosis here is highly unimportant. This is one of the cases where the surgeon rightly puts all the responsibility on the pathologist. One should not decide on the x-ray and clinical evidence what type of surgery was indicated. All one should decide is that a biopsy was indicated, and

\*Assistant professor of surgery Harvard Medical School visiting sur



then following the opinion of the pathologist one should be ready to go ahead with some kind of surgery, either a local removal or an amputation. It would be very difficult to plan any local removal of this process that would result in a useful leg. One might think of x-ray treatment, but such a decision depends on the diagnosis. There is one other bit of evidence to be considered—the chemical data. If she had a high blood phosphatase one would think that the tumor had probably shifted to an osteogenic type of malignancy in place of the giant-cell tumor. This particular phosphatase is not high enough to mean much.

For my first choice I am going to say that this process is a recurrent giant-cell tumor, and for my second choice, an unusual osteogenic sarcoma.

DR ERNEST A. CODMAN. This case was of unusual interest to me, not only because the patient was a very brave girl, but because there were a good many features in the case that were very instructive. Dr Lund, calling attention to the x-ray taken after the operation, assumed that the removal of the tumor had been incomplete. The fact is that the whole tumor was shelled out from beneath the joint cartilage and from the bony walls of the head of the tibia. Moreover the inner walls were smooth, and there was no gross evidence of invasion by the tumor. Dr Lund was deceived by this film because the posterior wall of the cavity remains intact, but the tumor was completely removed and a wedge-shaped flap of periosteum turned into the cavity with the express idea of having it develop on the line of stress according to Wolff's law, to form new structural bone. She did obtain good use of the leg, many of you saw her two years ago at the meeting we had on giant-cell tumors. She had perfect function and almost perfect contour for four years. Then suddenly, in November, 1938, acute pain began and was soon followed by swelling. She had had good function for four years. When she entered the hospital, the tumor was fluctuant, so that I hoped that it was an abscess, due possibly to a sequestrum, but when I explored I found a very malignant almost purely cellular tumor with no giant cells in it, it was quite different histologically from the original one. There were many mitoses.

She refused amputation at first but two weeks later we persuaded her to have it done, and Dr Van Gorder removed the leg. She went home and almost immediately developed metastases in the lungs and died. The duration from the development of signs of recurrence to death was only four months, and yet for four years after operation there had been no trouble.

To me one of the most interesting facts to record

is that at this operation I made the incision in the bone well below the tumor for the express purpose of finding what we call a concavoconvex line in the marrow. A giant-cell tumor always has a visible sharp concavoconvex line separating the marrow from the tumor tissue. In cases of osteogenic sarcoma there is always an irregular extension up into the medulla above the obvious tumor, that is, the tumor extends up in the medulla higher than the x-ray shows it. In giant-cell tumors, the x-ray shows this concavoconvex line. I made my periosteal flap starting about 5 cm below the tumor and took away the cortex in order to look at this line to see whether it was typical of giant-cell tumor. In the past I have taken every opportunity I could to examine the medullary invasion in different forms of tumor at the medical school museum and in registered cases. I find it almost an invariable rule that the concavoconvex line is present in giant-cell tumor. In the paper I wrote about this case<sup>2</sup> I made the statement that I believed that the surgeon should decide for himself, on finding that line, that it is one of a giant-cell tumor and go ahead and treat it as such. That line was present in this case and was perfectly typical.

Then another point, the gross appearance was characteristic. The surgeon knows the "currant jelly" appearance of this kind of tumor. Moreover, another gross sign was present. It shelled out easily, as it always does in giant-cell tumors, and very little was left on the edges or on the clean wall inside. Still another point in the gross appearance was its extension to and limitation by the joint cartilage. Of course the x-ray film is a little deceptive because the posterior wall was still present, but the whole thing was cleaned out. There were, however, little irregularities in the smooth walls where cells might have stayed. I purposely did not use a chemical cautery to remove such cells as might have been there, because I felt that they were probably giant-cell tumor cells and were of little danger.

Now, could such a malignant type of cell as we found at the second operation have been there for four years, together with the gradually developing new bone? The patient walked around perfectly freely without pain. If it was a malignant tumor in the beginning it took a long time to recur. Its rapid growth, when it appeared the second time, suggests a new tumor. This case was registered and went the rounds, all the men on the registry committee wrote "giant-cell tumor" on the specimens—as I think they would today. I believe that this is a very critical case in showing that surgeons and pathologists together cannot tell a giant-cell tumor every time. Dr Simmons several years ago pointed out that 75

per cent of supposed giant-cell tumors later developed into real malignant tumors. Recently when I went over the tumors of the knee joint I found almost exactly the same percentage. I think this is a minimum rather than a maximum figure, because I have found so many cases, in this community, where supposed giant-cell tumors later showed malignant changes. For instance, there was a case at this hospital which Dr. S. M. Roberts operated on and filled with bone chips. Dr. A. R. MacAusland, Dr. R. B. Osgood, Dr. C. C. Simmons, Dr. F. J. Cotton and others have had such cases. This case is especially important because it was so carefully studied by men as well qualified to know a giant-cell tumor as anybody. I personally took the responsibility of not using post-operative x-ray treatment. I am not sure now whether such treatment should be advised as a routine, of course several of the other cases that had malignant changes recurred in spite of post-operative x-ray therapy. We have also had cases in which x-ray treatment alone was used but in which the same result occurred.

DR. CHANNING C. SIMMONS. I have very little to add to what Dr. Codman has already said. There are three possibilities. First, there is a type of central fibrous osteogenic sarcoma that is often confused with a giant-cell tumor because it contains a few foreign-body giant cells. These are central tumors with bone destruction which in the radiogram does not extend to the epiphyseal line, otherwise the films closely resemble those of giant-cell tumor. Microscopically, foreign-body giant cells are found in the periphery of the growth. There have been four cases of that character in the hospital. Secondly, I believe the pathologist cannot always tell whether a given giant-cell tumor is malignant or benign. Thirdly, I believe a great many of these cases are benign giant-cell tumors primarily, but as the process of repair goes on and there is an attempt to fill the cavity with normal bone, the mesoblastic tissue making this repair finally takes on malignant characteristics and becomes an osteogenic sarcoma. I believe that this patient had a benign giant-cell tumor in the first place, and as a result of the process of repair, she developed an osteogenic sarcoma. At the present time I think it is difficult to distinguish between the two latter groups.

#### CLINICAL DIAGNOSIS

Recurrent giant-cell tumor

#### DR. LUND'S DIAGNOSIS

Recurrent giant-cell tumor

#### ANATOMICAL DIAGNOSIS

Osteogenic sarcoma

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. I agree with Dr. Simmons. I find it difficult to believe that a mistake could have been made on the original tumor because both x-ray and histological findings were so perfectly typical of a benign giant-cell tumor. Benign giant-cell tumors can of course recur but usually in a much shorter period than four years. It would seem more reasonable to me to accept the simple explanation that Dr. Simmons gave, namely, that in the process of repair a true malignant osteogenic sarcoma developed.

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#### CASE 25242

#### PRESENTATION OF CASE

*First Admission.* A forty-four-year-old white married woman was admitted complaining of pain in the left lower quadrant of the abdomen.

The pain first appeared about eight months before admission as a dull aching sensation in the left side of the lower abdomen an hour after eating. It occurred once a week and lasted from one to three hours. There were no other gastrointestinal disturbances. No medicinal or mechanical relief could be obtained. It seemed to be especially related to the eating of gas-producing foods. During the previous two months the pain had increased in intensity. Three weeks before entry the ache became unrelated to eating and was present when she assumed a sitting position. Bending forward caused increased pain, whereas standing gave partial relief. The pain had remained in the same position. She noticed tenderness in the left abdomen to her own palpation. The ache was noted every day until entry, lasted most of the day, and disappeared at night. It had never been sharp, had never radiated and was unrelated to respiration. During the previous two months there had been slight nausea in the morning, but she had never vomited, except on one occasion two weeks before entry after eating some fish which she ordinarily did not tolerate. During the previous two months she had had a diurnal frequency of five times and nocturia four times.

Her uterus had been removed two years previously for fibroids. She had severe headaches about once a month which lasted about six hours and seemed to be related to menstruation. She also had painful hemorrhoids. For the past six months she had had occasional hot flashes and

spells of weeping. Her past and family histories were otherwise noncontributory.

Physical examination showed a well-developed and nourished woman in no acute distress. Examination of the chest was negative. The blood pressure was 135 systolic, 74 diastolic. Deep palpation of the left abdomen beneath the costal margin gave the impression of a mass descending with inspiration. Pelvic examination revealed a moderately relaxed pelvic floor. Rectal examination showed a number of tender protruding hemorrhoids.

Examination of the urine was negative. Examination of the blood showed a red-cell count of 4,800,000 with 90 per cent hemoglobin, and a white-cell count of 8200 with 51 per cent polymorphonuclears. A blood Hinton test was negative.

X-ray films of the abdomen showed that the left kidney was obscured over its lower pole by a soft-tissue shadow which also partially obscured the psoas muscle. A retrograde pyelogram showed that the upper calices of the right kidney were deformed and pushed downward. The left kidney pelvis was large but not deformed. The ureters were normal.

The patient was kept in the hospital for nine days, but no obvious cause could be found for her complaints. The hemorrhoids were removed. She was discharged with a diagnosis of psychoneurosis, menopause, relaxed pelvic floor and fissure in ano.

*Second Admission* (seven years later). Two years before the second admission the patient entered the Out Patient Department, at which time two blood Hinton tests were positive, two Wassermann tests negative. She gave no history suggestive of primary or secondary syphilitic infection, and her husband had had a negative blood Hinton test in this hospital. She had had one miscarriage, her first pregnancy, but had three other children living and well. Her oldest daughter had had sore eyes at the age of nine years and subsequently had some injections at an outside hospital. The patient had become moderately obese during the past few years and was coming to the Out Patient Department for diet control. Twenty-two months before entry she was said to be losing weight too rapidly, had headaches, was nauseated and was unable to retain food. Two months later she complained of pain in the left axillary region, but examination of this region was negative. She continued having severe headaches about once each month, with hot flashes, nausea and vomiting. Four months later the blood showed a positive Hinton test and a weakly positive Wassermann test. She was being given courses of bismuth and salvarsan treatment. One

year before entry her youngest child, an eleven-year-old boy, entered the hospital with cirrhosis of the liver. His blood Hinton test was negative. X-ray films of the patient's chest ten months before admission were negative except for slight prominence of the left ventricle. Eight months before admission she had had a severe attack of upper abdominal pain occurring an hour after her evening meal, followed in two or three hours by severe vomiting and relieved by a hypodermic injection. Two months later she had had a similar attack. On each occasion the pain was gone the following day. Four days before admission, during the evening, there was a sudden onset of crampy, intermittent, severe upper abdominal pain, radiating to the back and to the right and left. Nausea and vomiting were associated with the pain so that she could retain nothing by mouth. The vomitus consisted of sour brownish material. During the day before admission she vomited almost continuously. She had had only one bowel movement during the four days. There had been no jaundice.

Physical examination showed a well-developed and nourished woman in obvious distress, complaining of abdominal pain. Examination of the chest was negative. The blood pressure was 120 systolic, 80 diastolic. The abdomen showed diffuse abdominal tenderness, without spasm but with slight distention and tympany. No fluid or masses could be made out. Pressure in the lower quadrants caused pain in the upper quadrants. Rectal examination showed tenderness on both sides. Pelvic examination was negative. The uterus was absent.

The temperature was 101°F, the pulse 110, and the respirations 20.

Examination of the urine was negative. The blood showed a white-cell count of 9000. The non-protein nitrogen of the serum was 17 mg per 100 cc, the chlorides 110.4 milliequivalents, and the van den Bergh 1.5 to 2 mg. A stool examination was guaiac negative.

A flat abdominal roentgenogram showed marked distention of the jejunal loops. There was little or no air in the lower small intestine and colon. A Graham test was positive.

On the third hospital day the patient had a chill followed by a temperature of 102°F. The chest was clear. She had no abdominal pain or tenderness. The skin was slightly icteric. Two days later she was doing well on a soft diet and had no pain, nausea or vomiting. Her chart was flat.

On the tenth hospital day an operation was performed.

## DIFFERENTIAL DIAGNOSIS

DR ROBERT R LINTON It appears to me as if this patient must have had something in her left upper abdomen on her first entry, although they did not include it on her discharge diagnosis. I also assume she had no further x-ray studies.

DR. AUBREY O HAMPTON Not until 1934, two years later.

The right kidney deformity seems to be due to rotation from pressure of the liver. I do not believe there is a tumor of the kidney. The soft-tissue shadow described here is not very obvious.

DR. LINTON The following points I believe are of significance. In a review of the first admission I am unable to make a definite diagnosis any more than the service was at that time. X-ray study showed that there was something in the left side of the abdomen and it seems a little odd that she did not have a gastrointestinal series and also a Graham test, if there was something pressing on the right kidney. It seems conceivable that it could have been a large gall bladder. It is not unusual in gall-bladder disease to have pain in the left side of the abdomen and even in the left lower quadrant. This is due to pancreatitis secondary to the gall-bladder disease.

"Her oldest daughter had had sore eyes at the age of nine years and subsequently had some injections at an outside hospital." That points toward a child with congenital syphilis. With these positive Wassermann tests we have to assume that the patient had a positive blood. Whether she had any other evidence of syphilis, I am not sure.

"One year before entry her youngest child, an eleven-year-old boy, entered this hospital with cirrhosis of the liver." That is a statement on which I should like a little more confirmation.

In summary I should say the diagnosis rests between two conditions. Are we dealing with gall-bladder disease with gallstones and pancreatitis or with partial intestinal obstruction? In reviewing her first admission the former diagnosis I should think is the one to favor. I shall rule out the kidneys as I see no further evidence that they were involved. The important thing is the question of gall-bladder disease and pancreatitis, and I do not think one can make a diagnosis of gall-bladder disease alone. Some other condition should be associated with it because of the fact that she had severe nausea and vomiting, and on account of the brownish character of the material she vomited. I have always remembered the teaching of Dr Daniel F Jones, that in simple gall-bladder disease patients very seldom, if ever, vomit to any degree, and that if they vomit large amounts and the vomitus is brownish in color, as in this case, one must look for some cause other than cholecystitis

and gallstones. Certainly pancreatitis, if associated with it, would produce such a picture.

She made quite a rapid response to conservative treatment, as I judge she was in fairly normal condition when they operated on her. A point I cannot overlook, however, in making a final decision in diagnosis is the x-ray report which says a flat abdominal x-ray film showed marked distention of the jejunal loops. There was little or no air in the lower small intestine or colon. In addition it is of significance that she had had only one bowel movement in four days. May we see the x-ray films?

DR HAMPTON The proximal loop of the jejunum is markedly dilated, and there is a very sudden stop in the upper abdomen with nothing to suggest dilated small bowel below the second loop of the jejunum. There are ten dense pills in this dilated loop, and if you knew when they were given, it might help a lot.

DR LINTON The fact that these pills were undissolved—I do not know what the pills are—rather points to the fact that they were being held up in the upper intestinal tract because of some obstructive lesion where you see the dilated loops of intestine. I think that this would also help explain the severe nausea and vomiting that she had prior to entry. It is a little surprising, however, that she got over this if she did have as complete obstruction as that would indicate. However, intestinal obstruction is sometimes intermittent due to a valve-like obstruction and the intestinal contents will pass along, especially if the obstructed loops are decompressed by nasal catheter drainage, until the upper loop becomes distended again.

I should say that there was no question that the cause of this patient's final admission to the hospital was intestinal obstruction involving the jejunum. The exact nature of the lesion I am afraid I cannot state. It was probably malignancy of some type. I do not believe it was a gallstone impacted in the jejunum, as gallstones, if they ulcerate through into the intestinal tract, are usually held up at the ileocecal valve. I have to make a diagnosis of cholecystitis, possibly cholelithiasis as well, but I think these are probably incidental. My final diagnosis is obstruction of the jejunum due to a malignant tumor, with a question of cholecystitis and cholelithiasis.

A PHYSICIAN What were the pills?

DR HAMPTON They remind me of sodium chloride pills. There are ten, and I wonder if they were given all at once.

DR FIORINDO A SIMEONE They were pills containing mercury that she was taking for anti-syphilitic treatment.

DR HAMPTON At what intervals?

DR. SIMEONE She took several a day. She was not definite as to the number taken per day or at what intervals.

DR. HAMPTON Do you think they had been there for days?

DR. SIMEONE I think so. She did not remember when she took them.

At operation she had a negative gall bladder. The organ was thin walled, soft, not distended and compressed easily, and there was nothing palpable in the common duct. Exploration of the abdomen revealed a tumor in the jejunum. The tumor delivered into the wound very easily, it was in the antimesenteric wall of the jejunum and was shaped like the fundus of the uterus. It was firm to touch and had small nodules over the surface measuring 0.5 to 1 cm. across. The nature of the lesion was not clear at the time. It was resected and the continuity of the jejunum re-established by side-to-side anastomosis.

DR. HAMPTON Did the bowel look as if it had been intussuscepted?

DR. SIMEONE No, but it looked as if there had been partial mechanical obstruction for some time. The proximal end was somewhat dilated and hypertrophied.

#### PREOPERATIVE DIAGNOSIS

Cholelithiasis and chronic cholecystitis

#### DR. LINTON'S DIAGNOSES

Malignant tumor of jejunum, with partial intestinal obstruction

Syphilis  
Cholecystitis and cholelithiasis?

#### ANATOMICAL DIAGNOSIS

Malignant lymphoma, giant follicular type, of jejunum

#### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY There was a quite marked, firm infiltration of the walls of the bowel for some distance, and the lesion was obviously neoplastic in gross. We were considerably surprised, however, by the final microscopic findings since this turned out to be a lymphoma of the giant follicular type. We have seen that type of lymphoma in many locations before, but we have never seen it as an isolated tumor of the bowel. It is, of all forms of lymphoma, the most slowly growing and the most clinically benign, so I think it is within limits of probability that she had had this tumor throughout her history. It is a little interesting that the medical student who saw her on the first entry made a diagnosis of lymphoma, though he did not place it in quite the right spot.

In these lymphomas of the gastrointestinal tract surgical resection may be the best form of treatment. We have had a number of cases with very long remissions—running from three to seven or more years—following surgical resection, and I think there is every reason to look forward to a long period of remission in this patient, although there is also no doubt that the tumor will eventually recur in some other spot.

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## THE ANNUAL MEETING

UNDER the auspices of the Worcester District Medical Society the City of Worcester opened wide its doors to welcome the Massachusetts Medical Society, June 6, 7 and 8, for the celebration of the one hundred and fifty-eighth annual meeting.

The new beautiful and commodious Municipal Memorial Auditorium provided ample space and accommodations for the section programs, scientific exhibits, motion pictures and commercial displays as well as for the Council meeting and that of the Society.

Registration was promptly underway at nine o'clock Tuesday, and practically all the exhibits were in order because of ample pre-convention time, in contrast with the confusion and noise of former years. This better state of affairs justified the

change of opening time from Monday to Tuesday.

There was an unfortunate delay in getting the Bancroft Hotel Ballroom ready for the Shattuck Lecture, but the large assemblage waited patiently until arrangements were completed, and Dr. Wilder Penfield must have been gratified with the close attention of the audience, which was treated to a scholarly and illuminating discussion of epilepsy and cerebral lesions of birth and infancy, with records of the results of treatment. This delay was no fault of the Committee of Arrangements.

The educational exhibits were of exceptional quality and were studied carefully by a large proportion of the fellows because of the variety and practical importance of the subjects presented. These, together with the motion pictures, made contributions to postgraduate education which were enthusiastically approved.

There were 1134 fellows and 257 ladies in attendance during the three days, making a total registration of 1391 thereby exceeding that of any previous annual meeting of the Society outside of Boston.

For the first time, the section meetings were carried through on a continuing program. As in previous years, the same was true of the combined meeting on Wednesday morning. This custom was generally approved. The only overlapping exercises were the round-table discussions on Wednesday afternoon.

Guest speakers from many important clinics brought the consensus of medical teaching to amplify the addresses of our members. The subjects which drew the largest audiences were medicine, surgery and obstetrics. The number in attendance at each exercise has been kept by the Committee of Arrangements for future reference.

There was a large attendance at the Council Meeting and the routine business of acting on the designated subjects was carried through as promptly as possible. Valuable information with suggestions for endorsement of resolutions or recommendations which were not of a controversial nature were submitted by several of the committees. Those presented by the Committee on State and National Legislation were so extensive, dealing as

they did with matters before the state legislature and Congress, that there was room for differences of opinion as to procedure. So far as state matters are concerned, the chairman reported success in overcoming unapproved bills but inability to secure legislative approval of all those measures which had been endorsed by the Council. He then made a detailed report of the situation with respect to the Wagner Bill and the conferences which had been held with the Massachusetts senators and with representatives of the American Medical Association. There were various suggestions as to the proper procedures to be followed in efforts to remove from the Wagner Bill those features which are inimical to the interests of the profession, and as a reflection of these differences of opinion, the nominations of the President for members of the Committee on State and National Legislation for the ensuing year were not unanimously acceptable and others from the floor were presented, this was followed by a vote by ballot for members of the committee. The result was not announced until the afternoon, the members of the new committee are Drs Charles C Lund (chairman), Earle M Chapman, Brainard F Conley, David L Lionberger and Charles A Robinson. All other committees were duly elected without contest.

On nominations by the committee acting under the provisions of the by-laws the following designated officers were elected to serve for the ensuing year: president, Dr Walter G Phippen, of Salem, vice-president, Dr A Warren Stearns, of Billerica, secretary, Dr Alexander S Begg, of Boston, treasurer, Dr Charles S Butler, of Boston, and orator, Dr W Jason Mixer, of Boston.

The proposed changes in the by-laws, copies of which had been sent to the councilors, were presented for action. With the exception of Amendment 4 and its corollary, Amendment 6, which were not approved, and a change in the wording of Amendment 3, the list was approved and forwarded to the annual meeting of the Society for final disposition.

Three hundred and thirty-two fellows and guests participated in the annual dinner at the Hotel Bancroft, Wednesday evening. The postprandial

exercises included the distribution of the prizes awarded to the golfers by the president, with appropriate witty comments, and an address by Mayor Bennett, of Worcester. The latter assured the Society of his appreciation of the honor conferred in the selection of the "Heart of the Commonwealth" for an annual meeting and, after urging doctors to devote more time to civic responsibilities thereby bringing to bear the influence of educated citizens on municipal problems, he cordially invited the Society to make Worcester its meeting place as often as possible. The orator of the occasion was the Honorable Henry Parkman, Jr., corporation counsel for the City of Boston and general chairman of the Tufts College Medical School Development Program. In regard to the latter, which is committed to the education of general practitioners for rural communities and also to such postgraduate instruction as may be needed by doctors of advanced age living away from medical centers, he explained the close association of Tufts College Medical School with the New England Medical Center, of which the Boston Dispensary is an integral part. All the details of this department were set forth and prominence was given to the provisions for substitutes who are assigned to fill the positions held by practitioners who wish to spend a month at the medical center for studying modern diagnostic methods and the latest advances in treatment. Credit was given to Tufts College Medical School for taking a forward step in meeting an obvious social obligation.

At the conclusion of the scientific program the annual meeting was called to order by the president, Dr Channing Frothingham. The incoming president, Dr Phippen, was introduced and, in response, assured the Society of his appreciation of the honor conferred on him and asked for the co-operation of every member in carrying forward the functions of the Society. The secretary, Dr Begg, reported that the membership of the Society is now 5432, a gain of 127 over that of last year. He read the several amendments to the by-laws which had been approved by the Council, the approval of the Society was voted. The Presi-

dent then read his report on the state of the Society, in which he reported that the financial condition is sound and well managed by the treasurer, Dr Butler, and that the committees of the Society had diligently and faithfully carried on the tasks assigned to them. Explanations were given of changes which had taken place in the personnel of these committees. Comments on the important problems before the profession were submitted.

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## MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

## LATE POSTPARTUM HEMORRHAGE

Mrs. N. L., thirty-five-years old, was readmitted to the hospital on December 15, 1938, twenty-six days after the normal delivery of her first baby, with a chief complaint of vaginal bleeding.

The family history was essentially negative. The patient had had a cholecystectomy and appendectomy seven years previously. In December, 1937, she had had a complete miscarriage at approximately the sixth week of pregnancy. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted three days with out discomfort. Her last menstrual period was January 30, making her due for delivery November 6.

She was seen regularly in the prenatal clinic of the hospital from the fifth month of her pregnancy, and at no time were there abnormal signs or symptoms.

On the afternoon of November 19, the patient was admitted to the hospital in active labor. During the first stage of labor 6 gr. of Nembutal were given. At 10.30 p. m. a normal living infant in ROA position and weighing 7 pounds, 12 ounces, was delivered spontaneously. An ampule of Pitocin was given subcutaneously. While awaiting the expulsion of the placenta and membranes, which, when delivered, appeared to be intact, a first-degree laceration of the perineum was repaired. Blood loss was estimated at 350 cc. Following expulsion of the placenta, 1/320 gr. of Ergotrate was administered subcutaneously, after which the uterus contracted firmly. The fundus was held for an hour. Tablets of Ergotrate (1/320 gr.) were given every four hours for six doses. The puerperium was uneventful. The discharge note, made on December 1, read "General condition good, uterus well involuted, anterior, freely movable, non-tender, perineum healed, relaxed, cracked nipples, lochia alba, slight, vaults non-tender and free of masses."

On December 15, two weeks after discharge, the patient was readmitted to the hospital as stated above. She described an initial profuse hemorrhage occurring December 8, followed by intermittent spotting until the evening before admis-

sion when another profuse hemorrhage occurred. Her family physician referred her back to the hospital. The temperature was 98.6°F., the pulse 76, the respirations 20, and the blood pressure 106 systolic, 70 diastolic. On physical examination there were a well-healed scar in the right upper quadrant, tenderness without spasm in both lower quadrants, a midline smooth rounded mass palpable just above the symphysis pubis, and vaginal bleeding of a slight degree. The red-blood-cell count was 3,870,000 with 75 per cent hemoglobin, and the white-blood-cell count 13,300. Urinalysis revealed a specific gravity of 1.028, an acid reaction, a trace of albumin, no sugar, gross blood, and many red cells and an occasional white cell in the sediment.

The patient was placed in Trendelenburg position and the vulva prepared. An ice bag was placed on the lower abdomen. A quarter grain of morphine and an ampule of Ergoklonin were administered subcutaneously. Morphine (1/6 gr.) was given every four hours for four doses, Ergotrate (1/320 gr.) was given every four hours for five doses. A four-hour chart with blood pressure readings was kept. Bleeding ceased altogether on December 19 and did not recur. The temperature remained normal, and the pulse never rose over 90 during the hospital stay. On December 24, the patient left the hospital. The uterus was well involuted, and no recurrence of bleeding occurred.

*Comment.* It is perfectly possible that the severe bleeding that occurred on December 8 and December 14 may have been caused by the retention and separation of a small piece of placenta and that the bleeding on December 15 at the time of admission was accompanied by the complete expulsion of all pieces of retained tissue. It is uncommon for bleeding such as this to occur unless associated with some form of retained products, however, it is very common for the first period after any delivery to be extremely excessive and occasionally so excessive that curettage becomes a necessity. Subinvolution is more frequently associated with continued dribbling than with excessive hemorrhage. Conservatism in the handling of this case after re-entry was stimulated by the fact that the bleeding had practically ceased, and it is quite probable that if the bleeding had recurred the uterus would have been invaded.

## MISCELLANY

## TUBERCULOSIS IN INDUSTRY

To what extent tuberculosis may be regarded as an industrial hazard is engaging the attention of industrial leaders, legislators and physicians. Not only occupation but also several other factors are responsible for tuberculosis among industrial workers. Ornstein and Ulmar

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

dent then read his report on the state of the Society, in which he reported that the financial condition is sound and well managed by the treasurer, Dr Butler, and that the committees of the Society had diligently and faithfully carried on the tasks assigned to them. Explanations were given of changes which had taken place in the personnel of these committees. Comments on the important problems before the profession were submitted.

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directed attention to the relation of trauma to tuberculosis. Tuberculosis has a specific etiology and, therefore, trauma cannot produce the disease. Trauma can, however, reactivate a previously existing active tuberculosis. Most of the confusion comes from the varied opinion concerning the time interval which may elapse from the date of the injury to recognition of the tuberculous disease.

Gases and vapors may also activate a pre-existent pulmonary tuberculosis by producing an inflammatory process in the vicinity of the pre-existing disease by irritant chemicals.

Trauma plays an important role in tuberculosis of organs other than the lungs. In this group the time element creates difficulties because of the inability to demonstrate the immediate spread of tuberculosis. Reprinted from *Tuberculosis Abstracts* June, 1939

## NOTE

Dr Douglas A Thom, professor of psychiatry at Tufts College Medical School, was elected president of the American Psychopathological Association at its recent meeting in Atlantic City. He succeeds Dr Abraham Myerson, who was elected to the council.

## CORRESPONDENCE

### AN AMERICAN HEALTH INSURANCE PLAN

*To the Editor* This plan compels the man or woman on salary to save in the savings department of a bank. A certain amount, estimated at 4 per cent of the salary, is earmarked and only used for sickness and accidents to pay the hospitals, physicians, nurses, dentists and druggists. This takes in every man and woman on salary and should be handled directly by the employer who places the money on deposit in the bank in the name of the employee.

It does not put the medical or dental profession into politics or allow control of the professions by the Government. It does not increase the number of government employees, nor does it put an increased burden on the Government or professions. It will decrease taxation as there will be fewer charity patients in the federal, state, county and city hospitals, since their compulsory savings make them financially independent, also it will help other hospitals for the same reason.

This fund cannot be used for automobiles, gay parties or gambling. The compulsory part of this deposit should accumulate as long as the employee is working. The employee should receive interest as in a savings account to be added to the principal or withdrawn as he sees fit. Any person not on salary should be allowed to deposit in the same way. On the death of the employee this deposit would act as a life insurance after all bills are paid.

This will tend to prevent the isms in government—Communism, Fascism, and so forth—and show the people the way to save.

ARTHUR N MAKECHNIE, M D

14 Upland Road,  
Cambridge, Massachusetts

### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

*To the Editor* In addition to the articles enumerated in our letter of May 2 the following have been accepted

Calco Chemical Co., Inc.

Sulfapyridine—Calco

Tablets Sulfapyridine—Calco, 0.5 gm (77 gr)

Lederle Laboratories, Inc.

Sulfapyridine—Lederle

Tablets Sulfapyridine—Lederle, 0.5 gm (77 gr)

Eli Lilly & Co

Estril—Lilly

Pulvules Estril, 0.06 mg

Pulvules Estril, 0.12 mg

Pulvules Estril, 0.24 mg

Estrone—Lilly

Ampules Estrone in Oil, 0.1 mg

Ampules Estrone in Oil, 0.2 mg

Ampules Estrone in Oil, 0.5 mg

Ampules Estrone in Oil, 1.0 mg

Suppositories Estrone, 0.2 mg

Merck & Co., Inc.

Riboflavin—Merck

Ampules Riboflavin—Merck, 10 mg

Ampules Riboflavin—Merck, 100 mg

Riboflavin—Merck, 1 gm. bottle.

Sulfapyridine—Merck

Tablets Sulfapyridine—Merck, 0.5 gm (77 gr)

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,  
Chicago, Illinois

## REPORT OF MEETING

### HARVARD MEDICAL SOCIETY

At the regular meeting of the Harvard Medical Society on Tuesday, February 28, in the Peter Bent Brigham Hospital amphitheater, Dr W T Salter presided. The program was opened by the presentation of two cases.

The first case, from the surgical wards and presented by Dr Fred Lesemann, was that of a thirteen year-old boy who was brought in following a coasting accident in which he ran into a tree and injured his left side. There was no loss of consciousness, only pain. Physical examination revealed an acutely ill boy breathing rapidly and distressfully. There was a small contusion over the ribs in the left posterior axillary line. Hyper resonance with decreased breath sounds and absent tactile fremitus was found over the left chest, and the heart and mediastinum were displaced to the right. X-ray examination confirmed the diagnosis of hydropneumothorax. A trocar allowed evacuation of blood and air, with considerable relief to the patient. For the next thirty six hours there was drainage of a moderate amount of blood. The temperature began to rise and remained in the vicinity of 104°F rectally for eleven days. *Staphylococcus aureus* was cultured from the drainage tube. One hundred to two hundred cubic centimeters of purulent material was drained, following which the temperature began to subside, and since then, drainage under water has been followed by an increase in the lung shadow and a decrease in the fluid shadow by x-ray.

Dr Robert Gross mentioned the two ways in which traumatic rupture of the lung can occur either as a result of fractured rib tears, or spontaneously when the glottis, diaphragm and rib cage are held rigidly fixed. The flap of torn lung tissue acts as a valve, trapping inspired air which collects in a few hours and forces the mediastinal contents over. It is a real emergency. The chest can be aspirated, or it may be necessary to open it surgically and allow the injured lung to remain collapsed until it heals. Dr O'Hare brought out the point that cases have been cited as having been caused by yawning or stretching.

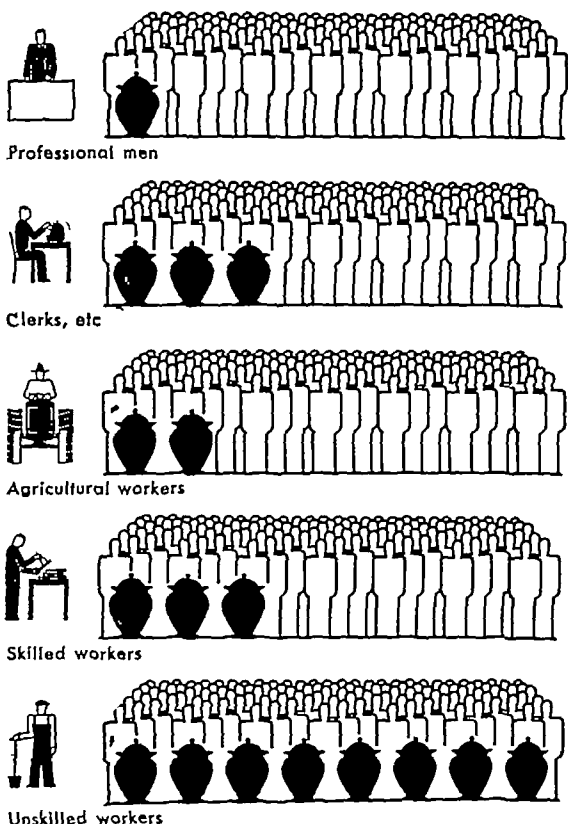
(Tuberculosis in industry *Quart Rev Sea View Hosp* 4 164-181, 1939) analyze these factors Excerpts from their paper follow

The death rate among the unskilled workers is more than twice that of the skilled workers Is this due to the industry or to lesser earning capacity? It is more probably due to the latter

Is tuberculosis an occupational disease? An occupational disease is one that arises out of the occupation per se. There must be a definite relation between the etiology of the disease and the occupation. The frequency of the occurrence of the disease in the occupation must be greater than the incidence of the disease in a similar group not so employed A high frequency of tuberculosis in a particular industrial group may be due to the fact that the labor is recruited from a section of the city where tuberculosis is more prevalent than it is in other sections Unskilled labor comes chiefly from those parts of the city where the tuberculosis death rate is high

In a few definite groups only may tuberculosis be considered as an occupational disease. These groups include *Workers caring for the tuberculous sick—nurses or derlies attendants, and so forth* The frequency of the

### Occupation Influences Tuberculosis



N T A Isotype Chart

occurrence of tuberculosis infection and disease among medical students and nurses has been noted by numerous workers There can be no question but that the opportunity for exogenous infection of the lungs by the tubercle bacillus presents itself in the care of the tuberculous sick. At Sea View Hospital, New York City, x ray evidence of pulmonary tuberculosis was found in 10 of the

1000 nurses during the period from 1930 to 1935, and 21 others developed lesions in the lungs while working in the hospital Of the 10 cases which showed evidence of disease on admission, 7 continued to work with either clearing or no change in the lesion, 1 broke down with a cavity and 2 did not start work. It is most important to note that while the incidence rate was low in the Sea View group (1 per cent) the occurrence rate was high, which indicates a definite hazard from an insurance standpoint. By contrast, the tuberculosis occurrence rate among employees of a large department store was found to be a small fraction as compared with that of the nurses group

Similar studies made among medical students have tended to show an increased incidence of tuberculous disease among them, presumably due to their occupation, which throws them in contact with open tuberculosis cases

In a great many general hospitals, the frequency of implantation of tubercle bacilli in the previously non infected probationers has been almost as great as that in the tuberculosis wards Many cases of open tuberculosis are admitted to the general hospital for surgical and other forms of treatment. The tuberculous disease is not suspected and the nurse takes no precautions against exogenous cross-infection while she attends the patient. The contact may be a continuous one without the tuberculous disease ever being discovered. The nurse later breaks down with the disease. The question of whether the tuberculosis acquired in a general hospital is an occupational disease will depend a great deal on the frequency of the admission of the tuberculous to the hospital

*Store clerks, saleswomen, waiters, conductors and others who have contact with a large number of people in whom there may be a high incidence of tuberculous disease* The presumption that the tuberculosis acquired in these occupations may be classed as occupational is based on the many opportunities for contact with open cases of pulmonary tuberculosis There must be a wide variation in the opportunities of contact infection in districts with small or high incidence of clinical tuberculosis Think of the possibility of such contact in the 5 and 10 cent stores in neighborhoods of low economic standards There are no definite figures as yet in such industries but the general impression is that the occurrence is frequent. The workers are not recruited from the slum sections, in some of the large cities they come from a good middle class where the incidence is not high

*Workers exposed to silica dusts* Silicosis is definitely an occupational disease. Many investigators have associated silicosis with the occurrence of pulmonary tuberculosis, but the authors dispute the commonly accepted belief that the deposit of silica in the lungs renders the lungs susceptible to infection by tubercle bacilli That most of the silicotics die of pulmonary tuberculosis is a debatable question

The present concept of the high mortality of tuberculosis is founded, not on extensive autopsy series, but rather on the computations of vital statistics This is a source of grave error, for not only can mistakes in diagnosis be made by the clinician so that the basis of the statistics is wrong, but also misleading conclusions can be drawn from the existing figures

The authors warn of the dangers of error in differentiating between silicosis and pulmonary tuberculosis, challenge the high frequency and death rate of tuberculosis as a complication of silicosis and assert that clinical tuberculosis should not be diagnosed in silicosis unless tubercle bacilli are demonstrable in repeated sputum examinations

*Workers exposed to trauma* Compensation laws have

patient who was on digitalis therapy for previous myocardial failure. In the seventh week of cyanate treatment, the blood pressure having been reduced from 240 systolic, 140 diastolic, to 150 systolic, 100 diastolic, nocturnal dyspnea and rales appeared. Treatment was stopped, and the signs disappeared. One year later the patient died of a cerebral accident, with a blood pressure of 250 systolic, 130 diastolic.

Three patients developed hallucinatory psychoses the first at a blood-cyanate level of 10 mg per 100 cc, having had a control systolic pressure of 275 mm, the second at 14 mg, after having had no drop after one month of therapy from the control systolic pressure of 300 mm (a true cyanate intoxication), the third overdosed herself to a blood-cyanate level of 24.9 mg, her pressure having dropped from 250 systolic, 140 diastolic, to 200 systolic 100 diastolic. The last patient returned to normal mentality in three weeks, when the cyanate level had been reduced to 15 mg.

Five of these 6 patients with serious effects were over fifty-five years of age. All had a very high degree of hypertension, and 4 of them had had previous serious episodes such as strokes, angina pectoris, heart failure, and so forth. It is to be concluded, therefore, that the choice of patients for cyanate therapy must depend on their having uncomplicated essential hypertension, preferably under the age of sixty. A blood-cyanate level of 14 mg per 100 cc. should be the absolute maximum, whereas a lower concentration should be maintained if possible. Finally, if there is a poor effect following a level of 10 to 14 mg for from two to four weeks, administration of the drug should be stopped. Carefully controlled, cyanate therapy is of definite value, in Dr Robinson's opinion.

In opening the discussion of Dr Robinson's paper, Dr O'Hare's comment was that, although cyanate therapy in carefully selected cases of hypertension offered more than did any other therapeutic method, it is not the ideal remedy because of the drug's toxicity. Until a better method is available it will serve a very useful purpose.

Dr Samuel Levine asked about the effect of cyanate on Goldblatt dogs, to which Dr Robinson quoted Barker's results showing no effect. It was said that, at the Massachusetts General Hospital, good results with cyanate therapy had been obtained in 2 cases out of a small series of 29.

Dr Robinson, in answering questions put to him, replied that the symptom of weakness was often temporary, disappearing when the patient became adjusted to the lower blood pressure level. He added that cyanate resistance, so-called, is a doubtful entity, since patients are responsive the second time the drug is tried after resistance to the first attempt.

## NOTICES

### REMOVAL

FRANCIS J McNAMARA, M.D., announces the removal of his office to 106 West Foster Street, Melrose.

### BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Wednesday, June 21, in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon.

The program, under the auspices of the laboratory department, will begin at 12:30 p.m.

Laboratory Diagnosis of Rabies. Dr William A Hinton.

Some Vascular Measurements in Hypertension. Dr Harold E MacMahon.

A Fatality From Acute Hemolytic Anemia Which Developed During the Administration of Sulfanilamide. Dr Harold Wood.

All interested in the subject are cordially invited to attend.

ROBERT W BUCK, M.D., *President*  
JAMES M. BATY, M.D., *Secretary*

### SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, June 27, at 12 o'clock noon. Dr Auerbach, pathologist, Sea View Hospital, New York City, will speak on 'Pathogenesis and Management of Tuberculous Pleural Empyema' and will show lantern slides.

Physicians are cordially invited to attend.

JOHN B HALL, M.D., *Secretary*

### CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in Andrew Carney Assembly Room on Monday, June 19, at 11:30 a.m.

#### PROGRAM

Case reports

Highlights of Recent Conventions

American Gynecological Society and American Medical Association. Dr L. E. Phaneuf.

American Association of Genito-Urinary Surgeons. Dr R. C. Graves

American Urological Association. Dr C. J. E. Kichham.

Physicians and medical students are cordially invited to attend.

ROY J HEFFERNAN, M.D., *Secretary*

### AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The American Board of Obstetrics and Gynecology announces that at the recent examinations held by the Board at St. Louis, Missouri, on May 13, 14, 15 and 16 two hundred and fifty-nine candidates were examined. Two hundred and twenty-eight candidates were successful in the examinations and were certified by the Board, twenty-nine candidates failed, and two examinations were not completed by the candidates.

At the annual meeting of the Board, held in St. Louis on May 12, it was found necessary, on account of increased administration expenses, to increase the application and examination fees. Effective immediately, these are to be as follows: application fee \$15.00, payable on submission of application for review by Board, examination fee \$75.00, payable on notification to candidate of acceptance of the application and assignment for examination. Neither fee is returnable. This increase does not apply to candidates whose applications were filed prior to May 12, 1939.

The next written examination and review of case histories (Part I) for Group B candidates will be held in various cities of the United States and Canada on Saturday, December 2, 1939, at 2:00 p.m. The Board announces that it will hold only one Group B Part I examination in this and subsequent years. Candidates who

The medical case was presented by Dr Albert C England. A thirty-five-year-old man was admitted for a check up on his high blood pressure. In November, 1938, he had had an attack of intestinal grippe, and the local physician had told the patient his blood pressure was very high, advised him to go on a low protein diet and gave him some medication, the patient kept on with his work. One week previously, which was two days before entry, the patient had a similar attack of abdominal cramping pains and decided to go to the hospital. Physical examination of the ocular fundi showed marked papilledema, the arteries were thickened and tortuous, and arteriovenous nicking was demonstrable. There were white exudates in a radiating star pattern at the maculas. His heart was moderately enlarged, extending 14 cm. out in the sixth left interspace, and there was a Grade 2 systolic murmur. The second aortic sound was loud and ringing. His blood pressure was 235 systolic, 160 diastolic, and slightly higher in the leg. The lungs were clear, the liver normal, and there was no edema. Urinalysis revealed a specific gravity of 1.010, none to a very slight trace of albumin, casts and cells. The red-blood-cell count was 5,000,000 with 70 per cent hemoglobin, the stools were guaiac negative, the phenolsulfonephthalein test gave a value of 45 per cent in two hours and ten minutes, the serum nonprotein nitrogen was 31 mg, the total protein 6.5 gm., the albumin 3.8 gm., and the globulin 2.7 gm. per 100 cc. The patient has been quite comfortable. The diagnosis was malignant hypertension.

The main part of the program of the evening was given over to Drs Roger W Robinson and James P O'Hare. Dr Robinson presented the paper "Further Experiences with Cyanate Therapy in Hypertension."

Briefly reviewing the work done on this subject, Dr Robinson stated that in 1901 sodium cyanate was first tried because of its similarity in action to that of the bromides, which are used in sedation and show a side effect in reducing hypertension. In 1925 Nichols revived interest in the drug but found nothing to recommend it because of its serious toxic effects. The dosage used at the time was 0.6 gm. daily. In 1931, Dr O'Hare and others tried the drug and found it lowered blood pressure in only 2 of 25 cases and produced toxic symptoms in almost all of them. Finally, Barker in 1936 discovered that, by maintaining an effective blood concentration of 6 to 10 mg per 100 cc., lowering of pressure could be obtained and toxicity avoided. He discovered that there was a very large factor of individualization of dosage, and explained on this basis the previous failures cited above. Forty-five patients were treated by him with enthusiastic results. Dr O'Hare decided to give it another try. The method of experimentation consisted in establishing a three-month control period, followed by three months of medication, and succeeded by another control period in which the drug was removed from the vehicle without the patient's knowledge—to avoid psychotherapeutic effects. Of 15 patients, 10 showed a significant drop in blood pressure and cessation of headaches. These results were reported in the *New England Journal of Medicine* (219 736-740, 1938). Since then the work has been extended until at this reading the results on 75 patients are available.

Because of the known toxic action of cyanate, complicated cases of vascular hypertension were, by and large, avoided. However, 4 of the 75 had had strokes, 1 had had angina pectoris, 1 a mild decompensation and 1 nephritis with impaired renal function. These 7 were treated very conservatively. All the patients were placed on the usual hypertensive regimen and had a control period of three months, during which sedation alone was given. Thirty-

three patients were followed for one year. Preliminary dosage consisted of 0.2 gm three or four times a day for three or four days. Following this the cyanate in the blood was determined, and the optimum dose was usually found to be 0.2 gm. twice a day, estimated on the basis of the cyanate level and the blood pressure. Often, a satisfactory level, namely, one in which there was a good drop in blood pressure without toxic signs, could be maintained by doses as low as 0.2 gm twice a week. The known cyclical nature of blood pressure readings in hypertension was taken into account, and psychological factors were evaluated, so far as possible.

Eighty-eight per cent of the cases showed a drop in systolic pressure of at least 30 mm. of mercury, and 11 per cent 60 mm or more, 62 per cent had a diastolic drop of 20 mm, 16 per cent of 30 mm. Three cases had a drop of 100 mm. systolic, 35 mm diastolic, for five months. One case, that of a young woman, has been on a cyanate regime for a year with good results. There were 9 cases with no drop in blood pressure. 3 of these in young patients with high diastolic pressures, 2 in elderly patients with arteriosclerosis, 3 in which the treatment was discontinued because of reactions, and 1 which was not adequately treated. The lowest blood pressure readings corresponded with the highest blood-cyanate levels and conversely. The usual marked fluctuations of blood pressure in such cases were much reduced by cyanate. Eighteen out of 20 had complete relief from hypertensive headaches.

There are many reasons that might explain these results such as an effect on the heart muscle, vasodilatation, lowering of blood viscosity by reducing its fibrinogen or total protein content, or a decrease in the oxygen consumption of all body tissues.

Twenty-nine patients exhibited toxic symptoms of one type or another. Of these, 23 cases were classified as mild. Weakness and lack of energy were the most frequent symptoms, occurring in 12 cases. In only 2 were they severe enough to require abatement or cessation of therapy. An experiment in the oxygen consumption of liver tissue offered a probable explanation for this weakness. It was noted that as the concentration of cyanate in the blood increased, the oxygen consumption decreased.

Skin manifestations of toxicity manifested themselves either as macular erythematous patches or as a rash simulating seborrheic dermatitis. Some patients gave reactions due to special sensitivity to the drug. Some had the rash only when drug resistant and, therefore, a blood-cyanate concentration of 12 to 17 mg per 100 cc. was maintained. Such rashes were transient, disappearing when the dose was decreased. One patient, however, had a generalized exfoliative dermatitis, a serious complication, but recovered. Three cases had areas of purpura during treatment, and an increased tendency to bleed.

Two male patients reported a decrease in libido.

There has been a question of the production of thrombosis following the lowered blood pressure, but to date no myocardial damage as a result of cyanate therapy has been proved. One elderly patient, however, had an attack of angina pectoris when his blood pressure dropped from 290 to 210 mm. Another patient, aged sixty-two years, was with angina and an extremely high blood pressure, was successfully treated with cyanate. However, eleven months later he had a sudden hemiplegia. Whether the cyanate produced this by lowering the pressure too much was not certain, but seemed unlikely in view of the fact that its general level was 198 systolic, 108 diastolic.

One case of congestive heart failure occurred in a pa-

gma. The book aims at furnishing the lay reader with unbiased findings and compilations from the best medical and scientific sources of the past two decades.

This book is just not another book on alcohol, but rather it offers an appeal to reason, judgment and intelligence from the medical, psychological and general hygienic aspects. Alcohol is not presented as a moral issue, though the effects of overindulgence on morals and behavior are not slighted. The book reports simple, concise facts regarding the effects of the use and abuse of a most important drug. It is an unprejudiced textbook relative to the physiological and psychological effects of alcohol. A few popular theories are exploded. The study presupposes an elementary knowledge of anatomy and physiology. Individual differences in susceptibility are stressed, as well as individual tolerance.

Statistical data are not given in detail but are summarized and analyzed in some cases to representative figures from national and local governmental authorities. The chapter on statistics is divided as follows: the supply and consumption of alcohol, drunkenness, accidents in their relation to alcohol, automobile accidents and non automobile accidents, crime in relation to alcohol, alcoholic mental diseases, mortality from alcohol.

This book emphasizes the facts that education is necessary in solving the problem of alcohol and that sobriety cannot be legislated nor can fear be used to influence public attitudes as regards the use of alcohol. It is indicated that the process of education must be informative and without bias and prejudice.

The last chapter is devoted to opinions of eminent specialists covering the crucial topics concerning alcohol and the human body.

The glossary is well arranged and explains many of the technical terms used in the text.

*Adventures in Respiration. Modes of asphyxiation and methods of resuscitation.* Yandell Henderson. 316 pp. Baltimore: Williams & Wilkins Co., 1938. \$3.00.

This volume is essentially a scientific autobiography. In it the author reviews his lifelong study of the physiology and pathology of breathing, and the practical application of the principles derived therefrom. The story covers a period of thirty years or more. It is written in that imitatively emphatic, yet good natured, style which is characteristic of Professor Henderson. Often criticized, he yet remains always cordial to his critics, which is more than can be said of some scientists.

His major thesis, and one first advanced by him at the beginning of his professional career, is that acapnia, or deficiency of carbon dioxide, which leads in turn to anoxia, or a deficiency of oxygen, is a factor of importance in many ills and adversities encountered by the human organism, as, for example, the depression of vitality after anesthesia, surgical operation, traumatic shock or severe illness of various sorts. He intimates that, where as he was never able to sell this theory to the intellectuals, nevertheless the present-day general use of carbon dioxide in the operating room and hospital ward gives it considerable vindication.

A prerequisite for living is an adequate supply of oxygen. An exclusion of oxygen extinguishes a fire, so too in a man or animal a deficiency of oxygen in the blood and tissues induces death in asphyxia. In dealing with the problems of asphyxia, however, the author emphasizes that acapnia must be considered as well as anoxia for the reason that a diminished supply of oxygen in the lungs and blood always induces a diminution of the content of carbon dioxide also by overbreathing and in other ways, and that not only does a deficiency of oxygen induce acapnia, but that acapnia in turn tends to intensify

the deficiency of oxygen, for it depresses respiration and renders the blood less ready to give up oxygen to the tissues. The relation between anoxia and acapnia is thus the heart of the problem of asphyxia. Oxygen is an essential food, but not a stimulant. Carbon dioxide, on the contrary, is a tonic and a stimulant, a stimulant that now annually saves thousands of lives.

The author, so your reviewer believes, successfully explodes the theory that asphyxia is essentially a state of acidosis by presenting evidence that carbon-dioxide administration is beneficial in asphyxia and harmful, or even lethal, in true acidosis, such as one induced by the administration of a mineral acid. The terms acidosis and alkalosis, or alkali reserve, moreover, are inherently confusing because without further description of the state named there is great difficulty in knowing what is meant by them. A lowered pH of the blood does not of necessity mean that an acidosis exists that must be combated by alkali. It may be one that can be successfully relieved by acid in the form of carbon dioxide. The pH of the blood is not an inherent quality, it is imposed upon the blood by the volume of the breathing at the moment. Excessive ventilation of the blood in the lungs induces a pH above normal, depressed ventilation a pH below normal. "High and low pH do not indicate alkalosis and acidosis. They indicate only the activity of respiration in comparison with the amount of alkali in use in the blood.

The activity of respiration is determined by the activity of the respiratory center, which controls it. Furthermore, the activity of the center is determined not merely by the stimulus applied to it, but by its own level of excitability. The latter can be altered through a variety of agencies, some of which, notably oxygen want, also pain, fever, alcoholic intoxication and the excitement stage of ether anesthesia, increase excitability, while others, such as sleep, high oxygen and morphine, depress it.

With regard to the amount of alkali in use in the blood, the author claims that, when carbon-dioxide tension in the lungs is increased, alkali is called into the blood from the tissues, and vice versa. This shift between blood and tissue with respect to base under the control of carbon-dioxide tension is an important part of his conception of the physiology of breathing. Oxygen want, he avers, first alters the excitability of the respiratory center, respiration then by overventilation throws the relation of  $\text{H}_2\text{CO}_3$   $\text{BHCO}_3$  in the blood out of balance, and the tissues, through a shift of alkali, restore the balance.

Following the chapters on the physiology of breathing is a series of chapters on pathologic states and their treatment in which the breathing is importantly concerned. Mountain sickness and acclimatization to high altitude come first, then carbon monoxide asphyxia. With regard to the latter the author has proved beyond doubt that the liberation of carbon monoxide from the blood and, consequently, recovery from asphyxia are more rapid when the poisoned subject breathes either air or oxygen, preferably the latter, enriched with carbon dioxide than when he breathes oxygen alone. The hyperpnea induced by the carbon dioxide leads to a far more rapid blowing off of carbon monoxide than does the inhalation of oxygen alone, and the high tension of carbon dioxide permits the hemoglobin to combine readily with oxygen and thus aids in the relief of asphyxia.

Through the development of the H. H. Inhalator and its addition, on a wide scale, to the equipment of the rescue crews of city fire and police departments, city gas and electric companies, hospital ambulances and mine rescue crews adequate resuscitation methods from carbon monoxide asphyxia have been made available to most persons likely to be afflicted.

Asphyxia neonatorum and resuscitation therefrom next

successfully complete the Part I examination proceed automatically to the Part II examination held later in the year.

Applications for admission to the Group B, Part I, examination must be on file in the secretary's office not later than October 4, 1939.

The general oral and pathological examinations (Part II) for all candidates (Groups A and B) will be conducted by the entire board, meeting in Atlantic City, New Jersey, on June 7, 8 and 9, 1940, immediately prior to the annual meeting of the American Medical Association to be held in New York City from June 10 to 14, inclusive.

Applications for admission to the Group A, Part II, examination must be on file in the secretary's office not later than March 15, 1940. For further information and application blanks, address Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

### 'CARLO FORLANINI' SCHOLARSHIPS

The International Union against Tuberculosis announces that six scholarships for advanced study in tuberculosis at the 'Carlo Forlanini' Institute in Rome have been made available to the Union through the Italian Fascist National Federation.

These competitive scholarships, of a value of 2000 liras, respectively, plus board and lodging, are intended to enable foreign medical practitioners to stay at the Carlo Forlanini Institute in Rome for the purpose of following a course of studies. This stage of eight months will correspond with the academic year (from November 15 to July 15) including the usual holiday periods. The scholars will reside at the Institute.

The scholarships will preferably be awarded to young physicians who are already familiar with tuberculosis problems and who wish to improve their knowledge of this branch of medicine.

The kind of work undertaken at the Institute will be subject to an agreement between the director of the Institute and the candidate.

Papers resulting from this work must be submitted for publication in the first instance to the editor of the *Bulletin of the International Union against Tuberculosis*.

The scholarships will be awarded at the next session of the Executive Committee which will meet in Berlin in September, 1939. The names of candidates, accompanied by particulars as to their age, qualifications and professional experience, must be forwarded to the Secretariat of the Union, 66, boulevard Saint Michel, Paris (6<sup>e</sup>), not later than July 15.

No candidature shall be taken into consideration unless it has been forwarded to the Executive Committee by a government or an association belonging to the International Union.

### SOCIETY MEETINGS AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 19

##### MONDAY JUNE 19

\*11.30 a m Carney Hospital monthly clinical meeting and luncheon

##### TUESDAY JUNE 20

\*10 a m 12 30 p m Boston Dispensary tumor clinic.

##### WEDNESDAY JUNE 21

\*12 m Boston Dispensary luncheon meeting of the clinical staff

##### FRIDAY JUNE 23

\*10 a m 12 30 p m Boston Dispensary tumor clinic.

##### SATURDAY JUNE 24

\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr. Henry A. Christian

Open to the medical profession

JUNE 19 — Carney Hospital monthly clinical meeting and luncheon Page 1019

JUNE 20 — Lawrence Cancer Clinic. Page 977 issue of June 8

JUNE 21 — Boston Dispensary luncheon meeting of the clinical staff Page 1019

JUNE 26-29 — National Tuberculosis Association Page 897 issue of May 25

JUNE 27 — South End Medical Club Page 1019

JUNE 27-29 — Medical Library Association Page 941 issue of June 1

JUNE 29 — Pentucket Association of Physicians 8 30 p m Hotel Whitaker 5 Washington Street Haverhill

AUGUST 30 SEPTEMBER 2 — Seminar in Physical Therapy Page 857 issue of May 18

SEPTEMBER — Boston Psychoanalytic Institute Page 450 issue of September 22

SEPTEMBER 4-6 — Institute for the Consideration of the Blood and Blood Forming Organs Page 941 issue of June 1

SEPTEMBER 5-8 — American Congress of Physical Therapy Page 857 issue of May 18

SEPTEMBER 11-15 — American Congress on Obstetrics and Gynecology. Page 938 issue of December 8

SEPTEMBER 14-16 — Biological Photographic Association Page 941 issue of June 1

SEPTEMBER 15-28 — Pan Pacific Surgical Association Page 863 issue of November 24

OCTOBER 23 NOVEMBER 3 — New York Academy of Medicine. Page 977, issue of June 8

FALL 1939 — Temperature Symposium Page 218 issue of February 2.

DECEMBER 2 — American Board of Obstetrics and Gynecology Page 1019

MAY 14 1940 — Pharmacopoeial Convention. Page 894 issue of May 25

JUNE 7 8 9 1940 — American Board of Obstetrics and Gynecology. Page 1019

### BOOKS RECEIVED FOR REVIEW

*Chronic Arthritis* Robert T. Monroe. Edited by Henry A. Christian. 84 pp. New York, London and Toronto: Oxford University Press, 1939. \$2.00

*Diseases of the Nose and Throat* Charles J. Imperatori and Herman J. Burman. Second edition revised. 726 pp. Philadelphia, London and Montreal: J. B. Lippincott Co., 1939. \$7.00

*The Mental Hygiene Movement From the philanthropic standpoint* 73 pp. New York: Central Hanover Bank and Trust Co., 1939

*Textbook of Medicine* By various authors. Edited by J. J. Conybeare. Fourth edition. 1112 pp. Baltimore: The Williams & Wilkins Co., 1939. \$6.75

*Medical Microbiology* Kenneth L. Burdon. 763 pp. New York: The Macmillan Co., 1939. \$4.50

*Cancer Handbook of the Tumor Clinic* Stanford University School of Medicine. Edited by Eric Liljencrantz. 114 pp. Stanford University: Stanford University Press, 1939. \$3.00

*Rural Medicine* Proceedings of the conference held at Cooperstown, New York, October 7 and 8, 1938. 268 pp. Springfield, Illinois and Baltimore: Charles C. Thomas, 1939. \$3.50

*Fluorine Intoxication* A clinical-hygienic study with a review of the literature and some experimental investigations. Kaj Roholm. 364 pp. London: H. K. Lewis & Co., 1937. 20s

### BOOK REVIEWS

*Alcohol in Moderation and Excess* A study of the effects of the use of alcohol on the human system. J. A. Waddell and H. B. Haag. 184 pp. Richmond: The William Byrd Press, Inc., 1938. \$1.00

This is an interesting book and one that physicians might well inspect. It reports a study made at the direction of the General Assembly of Virginia in 1936. It was rejected by the Assembly and was published later by two of the original compilers. The purpose of the study was that scientific findings concerning alcohol be made available to citizens of Virginia and that these findings be used as a basis for material taught in public schools of Vir-



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## CONVALESCENT CARE OF PATIENTS WITH CRANIOCEREBRAL INJURIES\*

DONALD MUNRO, M.D.†

BOSTON

THE care of patients who are convalescing from craniocerebral injuries has been largely empirical. Little attention has been paid to working out its details, and no attempt has been made to correlate the patient's needs with the antecedent injury and the resulting pathologic lesion. After leaving the hospital, the victim is usually told to "take it easy for a few weeks or months," "not to worry" and "not to return to work until he feels up to it." Headaches, dizziness, lack of concentration, easy fatigability, and the like are considered to be the usual accompaniments of the convalescent period. If they last longer than the doctor's patience, these same symptoms then go under the name of "post-traumatic neurosis" and the patient becomes a surgical derelict. While the primary need is for a better understanding of the original lesion caused by the craniocerebral injury, later intelligent oversight of the patient and his family is also requisite if the therapy given during the acute stages is to yield the results that it should.

### THE PRECONVALESCENT PERIOD

The length of the preconvalescent period will vary with the kind of injury, the accuracy of the doctor's diagnosis and the efficiency of his treatment. For example, if the patient has been diagnosed as a case of "concussion" and actually had concussion, he will have no preconvalescent period at all inasmuch as, by definition, the disease is ended with his return to consciousness. On the other hand, if the case has been diagnosed as one of "concussion" but the patient has in reality had a lacerated brain, or has been diagnosed as suffering from a "fractured skull" and really harbors a subdural hematoma, his preconvalescent care will constitute a major part of his treatment. Indeed, in the latter case it cannot be considered as having

ended until after the removal of the blood clot or its fluid equivalent, a procedure which may not be recognized as essential until years after the receipt of the injury.

Broadly speaking, preconvalescence after craniocerebral injuries ends and convalescence begins when the intracranial pressure has remained fixed at normal for an arbitrary period of two weeks. It should be understood, however, that previous to the start of this period all meningeal clots have been removed, all depressed fragments of bone been elevated or removed and no extracranial or intracranial sepsis is present. Two weeks is commonly considered as adequate for any normal wound-healing, provided the local circulation is efficient and the part at rest so that organization can be effected. Surgically clean cerebral injuries or wounds have the same requirements for healing that similar wounds elsewhere in the body do. In cerebral wounds, however, the local circulation is efficient only in the presence of a normal intracranial pressure. When this pressure is high, there is an associated venous congestion and local tissue anoxia. When it is subnormal, my experience convinces me that the patient's water metabolism is affected, that he is dehydrated and that here too the local circulation is inefficient. It is on this basis that the convalescence after craniocerebral injuries is held to begin at the end of a two-week period of constantly normal intracranial pressure, the part being maintained at rest and local organization effected by keeping the patient constantly in bed. Except as the result of tissue deficit or erroneous diagnosis the great majority of patients are symptom-free during this time. If they are not, and meningeal clots and local sepsis have been eliminated by appropriate measures the cause of their symptomatology will usually be found in associated disease processes such as arteriosclerosis, renal disease, impaired circulation, associated brain tumors, syphilis, multiple sclerosis, other injuries and the like.

Presented at a meeting of the Boston Surgical Society, Boston, April 24, 1939.

\*Assistant professor of neurosurgery, Harvard Medical School; surgeon in chief for neurosurgery, Boston City Hospital.

engages the author's attention. He points out that "much of common belief and practice in regard to manual artificial respiration is unsound or even absurd. Compressing the thorax of an apneic baby in which the lungs are still completely atelectatic cannot draw air into them. Gentle insufflation of air and carbon-dioxide mixture will usually start the infant's breathing very successfully."

Concerning postoperative depression, the author emphasizes the role of diminished tonus of the skeletal muscles, especially those of respiration, induced by anesthetics. This leads to diminution in the size of the chest cavity and promotes atelectasis of the lungs. The best way to combat this tendency is to secure elimination of anesthetics as quickly as possible, and this, in the case of the volatile ones, can be accomplished by letting the patient inhale carbon dioxide in suitable concentration.

The chapter on pneumonia seems, to your reviewer, the least convincing in the book. On the theory that atelectasis, the result of poor bronchial drainage, is an important factor in the development of pneumonia, the author again prescribes carbon-dioxide therapy. It is amusing, to the reviewer, that in the treatment of pneumonia we have had recommended both carbon-dioxide treatment to prevent atelectasis and artificial pneumothorax to produce it. In view of the other methods now at hand for the treatment of pneumonia, it is doubtful if either of the aforementioned has any important place in therapeutics.

So-called shock, in which he believed acapnia plays an important role, was one of the first subjects to engage Professor Henderson's attention, nor have the intervening years obliged him to reverse any of his fundamental concepts. Briefly, he believes the condition chiefly due to impaired venous return to the heart, and this, in turn, to decreased tonus of the body musculature resulting from acapnia or, as he now prefers to call it, acarbica. Furthermore, impaired return flow of blood to the heart leads to asphyxia, just as do failure of the heart itself and hemorrhage.

The final chapter is on muscle tonus and artificial respiration. In this he points out that manual artificial respiration is still the most effective emergency method of resuscitation. He also indicates the relation of muscle tonus to the possibility of resuscitation. The atonic thorax cannot be ventilated by any sort of manual manipulation. But tonus can be restored by the inhalation of carbon dioxide mixtures because this gas not only acts on the respiratory center, but also, so the author believes, exercises a strong tonic effect on the skeletal muscles, thus promoting the natural excursion of the thorax, as well as the return flow of blood to the heart when shock is a factor.

Whether all the author's theoretical structure will endure is doubtful. But at least it can be said that he has used his fertile imagination in a truly scientific manner and that he has pursued facts with vast energy. His facts, for the most part, we can accept as well substantiated. His interpretations occasionally leave us wondering. Professor Henderson deserves more credit than is sometimes accorded him, not only for contributing directly to the knowledge of his subject, but for stimulating a vast amount of work by others, and last, but not least, for contributing, to humanity, methods which have saved many lives.

The book is thought provoking and instructive. It is worth the while of any physician or surgeon to read it.

*Carbon Monoxide Asphyxia* Cecil K. Drinker 276 pp  
London, New York and Toronto Oxford University  
Press, 1938 \$4.50

This comprehensive monograph, written by a student of the subject for many years, is a scholarly and thorough presentation of the many aspects of carbon monoxide

hazards. It includes chapters on the physiology and biochemistry of the agent, acute poisoning and the problem of aftereffects, what constitutes harmful exposure, statistics and common sources of hazards, the pathology of the condition, the problem of chronic exposure, the treatment of acute exposures, and finally, chemical methods of detection of carbon monoxide in air and in the body.

The significant literature of the subject is covered and an extensive bibliography is appended.

The importance of carbon monoxide asphyxia becomes evident when we remember that annually in the United States nearly 4000 persons die from this cause. The majority of these deaths are suicidal, but accidental deaths are common and frequently due to preventable causes. Whenever organic matter is burned without adequate oxidation, carbon monoxide is produced. So that in addition to inhalation of illuminating and natural gases, hazards arise from motor-exhaust gas, coal or charcoal gas, smoke in conflagrations, blast furnace gas, gas from explosions, and the incomplete burning of illuminating and natural gases due to defective equipment or exhaustion of oxygen.

The author is inclined to discount the last factor, namely the exhaustion of oxygen, but, in the opinion of the reviewer, too many deaths have occurred in small closed rooms in which gas heaters in use were not faulty to leave much doubt that the lack of oxygen was a factor, even though gas flames were extinguished prior to serious consumption of oxygen. The temperature of the rooms and the circumstantial data in such cases make it probable that the deaths were accidental.

Doubt is thrown on the constancy with which the blood remains fluid in carbon monoxide poisoning, but experience of the reviewer in the examination of bodies, even at long periods after death, is that fluid blood will be found. Thromboses in small vessels, as in the brain, may occur, but they are found in persons who have survived the immediate exposure to the gas and are apparently due to local damage to vessels at the sites of thrombosis, that is, are of secondary production.

The somewhat moot question of chronic carbon monoxide poisoning is given thorough study. It is accepted that recovery from the immediate effects of exposures which result in prolonged unconsciousness may be followed by serious effects due to brain anoxia. It is agreed that persons with diseased organs, notably heart conditions, are much more prone to succumb to given exposures to carbon monoxide than are normal individuals. It has been demonstrated that acclimatization to carbon monoxide may result from repeated exposures, and may be associated with an increase of red cells to add to the oxygen-carrying capacity of the blood. The indefinite character of some of the subjective symptoms, such as gastrointestinal disturbances, insomnia, depression, irritability, burning of the eyes, ringing in the ears and palpitation, leads the author to be properly critical of the diagnosis of chronic carbon monoxide poisoning in individuals repeatedly exposed to small amounts of carbon monoxide. That the individuals who complain of these symptoms are frequently neurotics adds to the doubt of a specific relation in many of these cases. Some of the cases which have been reported, however, are recognized as indicating that there is a syndrome associated with long continued exposure to minor amounts of carbon monoxide which is prone to manifest itself in substandard individuals.

The procedures for resuscitation of subjects of carbon monoxide exposure are well covered, with illustrations of the various methods of artificial respiration.

The book is a welcome addition to the literature on an important subject and is highly recommended.

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†Assistant professor of neurosurgery, Harvard Medical School; surgeon in chief for neurosurgery, Boston City Hospital.

## THE CONVALESCENT PERIOD

With the wound healed and the patient free of symptoms, convalescent care after any disease is merely a matter of improving the patient's general condition in so far as his make-up and permanent physical deformities permit. Even adequate care, however, cannot be expected to correct symptoms that are traceable to actual loss or destruction of brain tissue, to the effects of scars or sepsis on the cerebrum, or to associated or intercurrent disease processes. Recognition of and adjustment to the deficits, and treatment of the associated and perhaps unrelated pathologic lesions, are easier and more efficient, however, if the convalescent care of the fundamental damage is intelligent and suited to the patient's needs and understanding.

Adequate but not too much rest, and constantly increasing exercise are classic, efficient and reliable methods for accomplishing this end. This holds true for cerebral as well as for any other wounds. However, the method of application differs in the former because of the curious psychologic reaction that the patient and his relatives and friends have toward injuries to the head or brain. As applied to the patient, this takes the form of a loss of initiative and unwillingness to accept responsibility for his own decisions. As applied to the family and friends, it takes the form of a super-solicitude which is fatally enervating and which supplements the patient's loss of initiative. If these factors are overlooked and not counteracted, the patient does not exercise except when it gives him pleasure, his rest is increased out of all proportion to his needs and his general physical condition not only does not improve but actually deteriorates. His relatives and friends and often his doctor are expected to wait on him more and more. This saps his initiative still further. It does not take much of this to produce the habit of invalidism from which it is only a short step to a permanent neurosis, the development of a new subjective symptomatology to rationalize this neurosis and permanent loss of earning power, self-respect and character. Once this succession of events has fairly started, it is almost impossible to interrupt its progress. Our only hope of reducing the numbers of such permanent invalids following craniocerebral injuries lies in its prevention.

The essential elements—the loss of initiative and the associated lack of self-confidence—are apparently due to two factors. One is the conviction in the average person's mind that a brain injury necessarily means insanity, epilepsy, loss of memory and judgment, and permanent invalidism. This, I should suppose, has its roots in the ideas that recognized evil spirits and witchcraft. In line with the medical education that teaches

us to go to bed and stay there in case of serious illness, the patient, in an attempt to avoid these aftermaths, will naturally tend to reduce his activities to the minimum unless urged to do otherwise. Another factor is a loss of confidence in the medical profession. This is due to the fact that it is common knowledge among the laity that doctors not only cannot cure but do not even believe in the reality of symptoms that persist after craniocerebral injury. An individual who is suffering from persistent headaches and who is honestly unable to earn his living on account of his incapacity is not to be put off with platitudes by doctor after doctor and still be expected to keep his confidence in the medical profession. Any well-managed convalescent regime after craniocerebral injuries should be so planned as to eliminate all element of "magic," and so as to ensure the retention by the doctor of the patient's confidence.

Convalescence after craniocerebral injury may be summed up, then, as a period during which an individual whose wounds have just healed needs direction in regard to returning his general physical condition to normal or better. These directions must be conditioned, however, by the doctor's recognition that the most important element in preventing the attainment of this end will be the patient's loss of initiative and lack of self-confidence. Any plan for convalescent care must, therefore, not only provide directions as to physical activity but must embody in them enough applied psychology to prevent the patient from interfering with his own recovery.

The first increase in physical activity comes with the start of the convalescent period, when the patient gets out of bed. This is the first opportunity to prevent him from losing his initiative. To accomplish this, he is directed to get out of bed in accordance with his own schedule. Specifically, the nurse and he are both made to understand that he and he alone decides how long he shall stay up and how long he shall lie down. He is told to govern the length of these periods by the way he feels. Thus, he is to stay up until he is tired, then return to bed and stay there until rested and then get up again. This start is important. It forces the patient to accept the responsibility for his own actions at the earliest possible moment. If he overdoes and develops symptoms, it is his fault, if he is underactive and does not progress, again it is his fault. Alibis and hence the development of rationalizing symptomatology are nipped in the bud.

As his activity increases, he begins to ask about leaving the hospital. This provides the doctor with the second opportunity to counteract loss of in-

itative Serious illness in the home is invariably accompanied—in the lay mind at least—by partial to complete limitation of the patient's activity to one floor and the taking of perhaps all meals but certainly breakfast in bed. It is equally true that it is impossible to look on an individual as seriously ill or as an invalid when he goes up and down stairs freely and has, as a matter of course, all his meals in the dining-room with his family. If the patient can be made to accept, without suspicion, the hospital equivalent of complete activity about his home, the chance of his developing invalidism in these latter surroundings is greatly decreased. However, all the patient knows at this time is that he is up and about all day and wants to go home. When told that his return home depends on his ability to remain active all day and to take two flights of stairs twice in succession he proceeds to do so at once. Thus, he has been persuaded to demonstrate publicly that he is neither physically incapacitated nor an invalid. Failure to live up to his own specifications after his return to the community labels him as a fool, a liar or both, and alienates what would otherwise prove to be the harmful sympathy of his family and friends.

Before letting the patient leave the hospital, however, he and his nearest relative are told in detail what permanent defects have been produced by his injury. It is important to do this at this time, and it is important to include a member of the family in the audience because only in this way can claims to invalidism based on alleged late discovery of a disabling symptom be forestalled. At this same interview it is also explained that the patient's further recovery depends solely on his improvement in general strength, that he is the only person who can bring this about and that he can only do it by taking increasingly larger amounts of regular exercise interspersed with adequate rest. He is further assured that if he gets overtired he will have symptoms due not to his brain injury, which is healed, but to exhaustion, and that if he loafs he will remain an invalid. A simple set of directions is given him. These call for out-of-door exercise every morning and afternoon, nine or ten hours in bed every night, a rest period on his back for one hour before the midday and evening meals, regular hours, plenty of water and no medicine. There are three prohibitions. The first is that he must never again drink alcohol in any form. It has been found that alcohol taken after craniocerebral injuries predisposes to convulsions and is abnormally toxic. The second is that he must not dive head first into water. It is believed that the sudden change from air to water

pressure as applied to the head with the rest of the body still in the air will frequently cause the patient to faint, with resultant drowning. The third prohibition is not to go onto high places unless there is provision against falling off if he becomes unconscious. Here, too, it is believed that many such patients are more than usually apt to faint under such conditions.

With these directions, the patient is sent out "on his own" for a month. This is the period that makes or breaks him, especially if he is a manual laborer. The ones in this group, regardless of the original injury or its treatment, especially if they belong to the emotionally labile races like the Italians and Irish, are the most likely to be failures. During this first month of convalescence, they, like all who are injured by other people's carelessness or while at work, are subjected to influences that have as their object not the promotion of the physical welfare of the victim but rather his cash value. Insurance adjusters, lawyers, police, interested friends and relatives, even interested doctors, begin to urge him to develop more symptoms, accuse him of malingering or refuse to accept as genuine symptoms that he knows are real. The development of a neurosis, under such circumstances, must be looked on as inevitable and a matter of self-protection. If, because of his economic situation he tries to go back to work, he finds that he is expected to return to his original job whether or not it is suitable, and furthermore must start in on a full-time basis. If he is unable to do this, he lays himself open to the accusation of loafing and shirking. I do not mean to imply that human nature as represented by the injured working man has any fundamental difference from that as represented by the stockbroker, the lawyer or even the doctor. There is always a certain irreducible minimum of the population who will seize any opportunity and use any means to feather their own nests. I do believe, however, that the percentage of such individuals among patients with late symptoms after craniocerebral injuries is far lower than is generally conceded.

If the patient gets through this first month of his convalescence successfully and reports back to his doctor for further instruction, he should be urged to increase his exercise, diminish his rest period and carry on for another month. At the end of the second month, he should be able to return to work on a part-time basis in a job that is suited to his new physical capacity and, at the end of another two weeks, be a full-time employee again. Furthermore, he should have learned by then that his craniocerebral injury is actually a thing of the past, that his convalescence did bring his general condition back to normal and that

his initiative and self-confidence are as good as they were before his injury

It can doubtless be successfully argued that there have been many patients with craniocerebral injuries who have fully recovered without such detailed convalescent care. I am also fully aware that recoveries even with this regime are not so common as I should like or as is desirable. As long as lacerated brains are diagnosed as concussion, and subdural hematomas go unrecognized for years, attempts to estimate the effects of any method of treatment on the end results of acute craniocerebral injuries are futile. Nevertheless a start must be made, and a therapy, no matter how bad it is, that includes planned care during convalescence is surely better than one that ignores this stage of the illness altogether.

#### SUMMARY AND CONCLUSIONS

The convalescence of a patient who is recovering from a craniocerebral injury should be planned in such a way as to correlate his needs with the

antecedent injury and the resulting pathologic lesion

The preconvalescent period may vary from a minimum of seconds in a properly diagnosed case of concussion to years in a neglected case of unrecognized subdural hematoma

The convalescent period begins after the patient has had a constantly normal intracranial pressure for two weeks

Loss of initiative and lack of self-confidence on the part of the patient are constant accompaniments of a craniocerebral injury. Otherwise such injuries differ in no important way from wounds elsewhere in the body

The convalescent care of patients with craniocerebral injuries should not be of a hit-or-miss type, but must be carefully planned to keep this associated destruction of initiative and self-confidence from developing into a permanent neurosis and spoiling the end result of what might otherwise have been a successful case

### TECHNIC FOR THE SUCCESSFUL USE OF PROTAMINE-ZINC INSULIN\*

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A TIMELY editorial in a recent number of the *Journal of the American Medical Association*<sup>1</sup> calls attention to the fact that all is not so well with the use of protamine-zinc insulin, and that the untoward effects of this agent are becoming steadily more recognized. In a paper describing the advantages and disadvantages of protamine-zinc insulin one of us (W. S. C.)<sup>2</sup> called specific attention to some of its undesirable features and recommended certain precautionary measures in its employment.

This paper is concerned with the presentation of certain recommendations which will aid in taking full advantage of the prolonged effect of precipitated insulin, and at the same time avoid the pitfalls and complications attendant on its use.

Before presenting our recommendations, it is well to review the pharmacologic properties of unmodified insulin and protamine-zinc insulin, especially in relation to their effect in lowering the blood sugar. The injection of a dose of unmodified insulin produces certain characteristic changes in the blood-sugar curve. If it is given

intravenously there occurs a refractory period of almost ten minutes during which the blood sugar remains at a practically stationary level. At the end of this period there occurs a very rapid and precipitous drop in the blood sugar. Regardless of the dose, we have observed that the rate of fall in blood sugar is roughly 17 mg. per unit per minute. The total drop is somewhat but not greatly influenced by the dose of insulin administered. The important difference between a large and small dose lies in the total duration of the insulin effect. The larger the dose, the longer will its effect be manifested. These results are similar in the diabetic patient whose initial blood sugar is abnormally high or low. The use of unmodified insulin by the subcutaneous route produces blood-sugar curves which in their general configuration resemble those following the intravenous administration of insulin.

Protamine-zinc insulin, on the other hand, produces a decided change in the character of the action described above. By virtue of the fact that this precipitated insulin is slowly soluble in blood serum, it obviously is not so promptly available as is the unmodified insulin. Enough experimental investigations of the blood-sugar curve following

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the administration of protamine-zinc insulin have been reported<sup>3</sup> to indicate that its full effect is not manifested before the seventh or eighth hour after its administration

Because of the slow liberation of the molecule of insulin from its precipitated form, the duration of the insulin effect becomes definitely prolonged. Thus as it is at present commonly employed, protamine-zinc insulin, in order to be made therapeutically effective during the prandial state, must be given in a dose so large as to be effective during the prandial period of the following day. The chief difficulty in the use of protamine-zinc insulin appears to lie in the fact that the lasting action of the drug has the effect of producing a hypoglycemic state during the postabsorptive period, which lies between 2 a. m. and 8 a. m. This has been borne out by our own clinical experience that the commonest period during which patients have hypoglycemic attacks from protamine-zinc insulin occurs between four and seven in the morning.

It is well in passing to state that the clinical picture of insulin overdosage following the use of protamine-zinc insulin is vastly different from that produced by unmodified insulin. The former is usually characterized by manifestations associated with functional disorders of the central nervous system, such as drowsiness, headache, listlessness, diplopia, aphasia, fatigue, nausea, paresthesias and marked emotional crises, such as crying spells, shrieking, transitory depressions and coma. The well-known shock symptoms which follow overdosage of unmodified insulin such as trembling, pallor, sweats and hunger seem to be curiously absent.

The experience of a hypoglycemic attack must be looked upon as a serious and harmful episode notwithstanding its occasionally trivial and transient character. Baker and Lufkin<sup>4</sup> have observed multiple petechial cerebral hemorrhages in animals that died following a long-standing insulin hypoglycemia. Many reports in the literature have seemed to prove that insulin shock in the elderly diabetic patient is attended by such vascular effects as spasm or thrombosis of cerebral arteries and coronary arteries.<sup>5</sup> Pathologic changes in the electrocardiogram have been reported during periods of insulin hypoglycemia.<sup>6</sup>

We must at this point call attention to an extremely important phenomenon in connection with hypoglycemic states. In the investigation of fasting blood sugar determinations on patients treated with protamine-zinc insulin, we have not infrequently observed blood sugars as low as 40 mg per 100 cc in a patient entirely without symptoms. The dangers in the use of protamine-zinc insulin thus become obvious if the hypoglycemic

state can exist in an individual free of subjective or objective clinical manifestations of this condition.

From our experience with the use of protamine-zinc insulin in 375 diabetic patients over a period of almost two years, we have established a technic which we find to be successful. With our procedure we are able to secure the maximum efficiency of the agent and at the same time avoid untoward reactions. It is our belief that many reports in the literature which have a tendency to discredit the clinical value of protamine-zinc insulin are due to a faulty technic.

#### TECHNIC

There are several factors to be considered in the proper use of protamine-zinc insulin. They are as follows:

##### *Selection of Patient*

If a diabetic patient is receiving one dose of insulin a day, is living on a diet sufficient to meet with the physiological requirements, is free of sugar in his urine and his blood sugar is close to the normal range, we consider him adequately controlled and not a candidate for protamine-zinc insulin. When, on the other hand, the diabetes is severe enough to warrant the use of two or more doses of insulin a day, protamine-zinc insulin should be employed. This statement, however, is made with a slight reservation. Since the elderly, sclerotic diabetic patient is susceptible to serious clinical complications arising from vascular spasms, we think that the hypoglycemic state in these cases must under all circumstances be avoided. Thus the elderly diabetic patient is generally not a suitable subject for protamine-zinc insulin.

In summary, we find that the patients in whom protamine-zinc insulin produces the best results are those between the first and fourth decades with severe diabetes requiring more than one dose of insulin a day.

##### *Insulin*

Our method of using protamine-zinc insulin is based on the following principle. Since several hours elapse after the injection of the drug before its pharmacologic action becomes manifest, and since its effective use comes during the postabsorptive period of the same day and the prandial state of the following day, we have found that the safest way in which to use protamine-zinc insulin is to resort to the administration of unmodified insulin for the production of the insulin effect in the prandial state, and to depend on protamine-zinc insulin for its blood-sugar-lowering effect during the postabsorptive state. Stated in different terms, twenty-four hours after the administration of

protamine-zinc insulin the patient should be recovering from an insulin effect. In order to carry this out in practice it becomes necessary to aim to give minimal doses of protamine-zinc insulin, and to resort to the use of unmodified insulin for the care of the immediate prandial period. We have found in practice that when a patient's total insulin requirements are greater than 20 units a day, an additional injection of unmodified insulin should be given. In the successful use of insulin in our cases, producing maximum insulin efficiency with minimal episodes of hypoglycemia, we cite the following typical combinations of doses which different patients take:

PROTAMINE-ZINC INSULIN units	UNMODIFIED INSULIN units
20	5
20	10
25	10
25	15
30	15
40	15
40	20
40	30
40	40
50	40
60	40

In other words, the dose of protamine-zinc insulin best suited to most of our patients varies between 20 and 60 units, depending on the severity of the disease. If the patient needs more than 20 units, the additional use of unmodified insulin is resorted to. The dose of the latter varies between 5 and 40 units. The preferable time to administer either or both types of insulin is in the morning before breakfast.

It is important to instruct the patient not to mix the unmodified and protamine-zinc insulin when both preparations are to be taken. They should be given in two separate injections, one following the other and in different sites. The reason for this is that, since insulin is precipitated by protamine in an alkaline state, and the reaction is so adjusted in a protamine-zinc insulin preparation, its addition to commercial unmodified insulin, which is an acid solution, has the effect of returning it to a soluble form, thus vitiating the benefits of the precipitated insulin.

#### DIET

The determination of the diet from the standpoint of its total caloric value or its various components of carbohydrate, protein or fat is beyond the scope of this paper. The important consideration in the diet in relation to our suggested method for the employment of protamine-zinc insulin is that half the total carbohydrate should be divided between breakfast and lunch. The other half should be distributed between the evening meal and the intercal feeding. In practice we find that the following proportions are optimal: breakfast, 25 per cent, lunch, 25 per

cent, dinner, 20 per cent, intercal feedings, 30 per cent.

We stress the use of intercal feedings as being one of the most important factors in the proper management of the diabetic patient receiving insulin therapy. These feedings when properly timed have the effect of furnishing the patient with carbohydrate at a time when he is under a maximum insulin influence and is susceptible to hypoglycemic attacks. Knowing that unmodified insulin has an immediate and profound effect, patients are very susceptible to hypoglycemic attacks two or three hours after its injection. Thus the administration of 15 gm of rapidly absorbable carbohydrate in the form of orange juice or any other fruit given two hours after the insulin protects the patient against a hypoglycemic attack. Lunch should be given exactly four hours after breakfast, followed by another intercal feeding about three hours later. A third such feeding should be given just before retiring, and should consist of carbohydrates and also some protein from which the carbohydrates are slowly made available. Thus a practical feeding schedule consists in the distribution of the carbohydrates in the following way:

TIME	MEAL	PER CENT OF TOTAL CARBOHYDRATE IN 24 HOURS
8 a. m.	Breakfast	25
10 a. m.	Intercal feeding	7
12 noon	Lunch	25
3-4 p. m.	Intercal feeding	7
6 p. m. (later if possible)	Dinner	20
11-12 p. m.	Postcal feeding	15

#### FOLLOW-UP CARE

The subsequent management requires that the patient examine his urine every morning on arising and every evening before dinner. Visits to the physician should be made at monthly intervals. The patient should come prepared with a fractional collection of urines of the previous twenty-four hours. This is a great advantage over the old method of examining a mixed twenty-four-hour sample. The investigation of the fractional urines will disclose the time when the patient is excreting sugar and the time when he is not. The different time periods in the pharmacologic action of protamine-zinc insulin and unmodified insulin being known, it is obvious that the period of the insulin effect should be established with fractional urine examinations. These fractional specimens need not have any relation to the feedings, but should be those that the patient voluntarily voids at all times in the twenty-four-hour cycle before his visit. The fasting blood sugar should be determined at this time. The information obtained from both the fasting blood sugar and the fractional twenty-four-hour specimens of urine will aid materially in determining any alteration in the



dose of insulin. The dose of protamine-zinc insulin is changed according to the blood-sugar findings. An elevation in the blood sugar means that the patient is receiving an insufficient quantity of protamine-zinc insulin. A hypoglycemic blood sugar means that the patient is receiving too much protamine-zinc insulin. The dose of unmodified insulin, on the other hand, is altered depending on the character of the fractional urine estimation. If there is prandial glycosuria, there is of course an indication for an increase of the unmodified insulin. The absence of prandial glycosuria with prandial hypoglycemic attacks requires a reduction in the unmodified insulin.

#### TREATMENT OF HYPOGLYCEMIA

Hypoglycemic reactions occurring during prandial periods will develop in the intercibal periods if the patient is either tardy with the intercibal feedings, entirely neglects to take them or is receiving too much unmodified insulin. These reactions are easily controlled by means of an immediate feeding of a soluble carbohydrate such as 120 cc of orange juice to which two teaspoonfuls of sugar have been added. The patient will then be completely relieved of his attack and will have no further difficulty, for his feedings will protect him against an immediate recurrence. The picture, however, of hypoglycemia which occurs during the night is vastly different, for it is the result of the action of protamine-zinc insulin. The immediate administration of rapidly absorbable carbohydrate will have the effect of relieving the attack, only to have the hypoglycemic symptoms return within an hour or an hour and a half. This is because the carbohydrate has already been consumed and the protamine-zinc insulin is still producing its profound action. The treatment of the protamine-zinc insulin hypoglycemia should in this case consist of feeding rapidly absorbable carbohydrates every hour after the attack until the physician is certain that the patient is over his insulin effect. This may last as long as from four to six hours. Under these circumstances all insulin should be discontinued until traces of sugar have appeared in the urine.

#### TREATMENT OF BROKEN CARBOHYDRATE TOLERANCE

It is a well-known fact that the development of any infection in a diabetic patient is characterized by a marked reduction in insulin efficiency and results in a rapid break of his carbohydrate tolerance. This peculiar vulnerability of insulin activity to the presence of infection appears to be more marked in cases where protamine-zinc insulin is employed. This inactivation of protamine-zinc insulin by infection has been experimentally

demonstrated by Himwich and Fazekas<sup>7</sup> and we have observed the same phenomenon clinically. Where the break in tolerance becomes severe, it is advisable to suspend temporarily the use of protamine-zinc insulin and resort to multiple injections of unmodified insulin until the period of infection has passed. If, on the other hand, the break in tolerance is only mild, adequate control can be established by increasing both modified and unmodified insulin in the morning and giving an additional dose of unmodified insulin before the evening meal. It is advisable that fractional urines be examined during the entire period of the break in tolerance.

#### TECHNIC FOR TRANSFERRING THE PATIENT FROM UNMODIFIED INSULIN TO PROTAMINE-ZINC INSULIN

There appears to be considerable fear in the minds of many physicians regarding the transfer of patients who have been on a regime with unmodified insulin to one of protamine-zinc insulin. Observers have frequently recommended a period of hospitalization in order to effect this transfer. We do not find this procedure necessary under any circumstances. The transfer can be easily performed in ordinary office practice. If a controlled patient is taking up to 20 units of unmodified insulin a day in divided doses, it is possible to give him 20 units of protamine-zinc insulin in one dose before breakfast. If, on the other hand, his diabetic control is established with over 20 units of insulin a day, we recommend the additional employment of unmodified insulin. Transfers may be effected according to the following schedule:

PREVIOUS TOTAL DOSE UNMODIFIED INSULIN units	NEW DOSE	
	UNMODIFIED INSULIN units	PROTAMINE-ZINC INSULIN units
20	0	20
30	5	20
40	10	25
50	15	30
60	20	30
70	25	35-40
80	25	40-50
90	30	40-50
100	35	50-60

It is important to remember that the dietetic suggestions which we have recommended, especially in so far as the use of intercibal feedings is concerned, should be rigidly followed. It is suggested that fractional urine samples be examined daily for approximately one week before the stabilizing dose of protamine-zinc insulin is established. The fasting blood-sugar level should be determined once a week for the first month after the transfer.

#### CONCLUSIONS

A technic for the successful employment of protamine-zinc insulin is described, whereby it is

possible to exploit all the benefits of protamine-zinc insulin and at the same time prevent its undesirable side effects. We recommend the use of this agent as a far-reaching advance in the treatment of diabetes.

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## CHIARI'S SYNDROME IN A PATIENT WITH POLYCYTHEMIA VERA\*

### Report of a Case

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**O**CCCLUSION of the hepatic veins due to thrombophlebitis is uncommon, but when it occurs it produces a well-defined group of signs and symptoms. Although the earliest recorded case of this symptom-complex is that of Budd,<sup>3</sup> Chiari's<sup>4,9</sup> more complete studies in 5 patients seen in his clinic forty to fifty years later have led to the connection of his name with the syndrome. As has been pointed out in the reviews by Hess,<sup>9</sup> Thompson and Turnbull,<sup>19</sup> Satke<sup>16</sup> and Hutchinson and Simpson,<sup>10</sup> the hepatic thrombophlebitis responsible for the clinical picture may be either primary or secondary to a variety of lesions situated at the junction of the hepatic veins and inferior vena cava. These lesions include neoplasm, hydatid cyst, gumma, nonspecific inflammatory masses, chronic perihepatitis and cirrhosis of the liver.

The occurrence of this symptom complex in polycythemia is extremely rare. One case was described by Oppenheimer<sup>15</sup> in 1929, since then 7 others have been reported.<sup>2,5,12-14,17,20</sup> Of the 8 cases of the syndrome thus far described, the hepatic thrombophlebitis occurred alone in 5,<sup>2,12-15</sup> in association with thrombophlebitis of other abdominal viscera in 2<sup>5,17</sup> and as a complication of cirrhosis of the liver in 1.<sup>20</sup>

Because of the rarity of the syndrome, it has been thought desirable to report the following case.

#### CASE REPORT

C S (B I H 41557), a 27 year-old American white married painter, entered the Beth Israel Hospital on May 20, 1938, complaining of swelling of the legs of 1 week's duration. The family history was negative except for tuberculosis in one brother. The past history revealed the usual childhood diseases, frequent head colds and an episode of diar-

rhea lasting several days 3 years before admission. The present illness began 3 weeks before entry with sudden onset of dizziness, epigastric distress, a sensation of warmth and malaise. A physician told the patient he had the grippe. His fever and malaise subsided in 3 or 4 days. A week before admission he developed severe pain in the flanks which lasted for about a day. Three days later his abdomen and ankles became swollen.

Physical examination on admission was negative except for dullness and diminished breath sounds and fremitus at the right lung base posteriorly, shifting dullness and fluid wave in the abdomen and moderate pitting edema of the legs. Ophthalmoscopic examination showed only moderately engorged veins. The blood pressure was 115/80.

The red blood-cell count fluctuated between 6,760,000 and 6,890,000, with a hemoglobin of 121 to 132 per cent (Dare). The white blood-cell count ranged between 11,000 and 21,000, with 71 to 91 per cent polymorphonuclears. The hematocrit was 64 per cent, and the platelet count 2,000,000. Four urine examinations revealed a maximum specific gravity of 1.024. All other urinary findings were negative except for the presence of bile. A small amount was noted on the day of admission, this increased during the next week. Five stool examinations were not remarkable. The blood nonprotein nitrogen was 45 mg. per 100 cc. on admission, fell to 35 mg. 2 days later and then rose to 100 mg. The icteric index on admission was 6 and rose steadily to 30, at which time the serum bilirubin was 4.2 mg. per 100 cc. The serum protein concentration was 5.8 gm. per 100 cc. The serum cholesterol was 135 mg. per 100 cc. on two occasions, with a cholesterol-ester value of 37 mg. Blood Hinton and Kahn reactions were negative. The venous pressure was 10 cm. by the direct method, and the arm-to-tongue decholin circulation time was 12 seconds. A galactose tolerance test revealed excretion of 1.03 gm. after the ingestion of 30 gm. The total extracellular fluid volume on May 23, as calculated by the method of Crandall and Anderson,<sup>8</sup> was 24.7 l., a value approximately 40 per cent higher than normal for his body build.\* An electrocardiogram on May 25 was normal.

X-ray examination of the heart and lungs was not remarkable except for elevation and diminished respiratory movement of the right dome of the diaphragm.

The pitting on pressure of the tissues of the legs was not elicited after the 2nd hospital day. An abdominal

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\*The actual excess water available for the solution of sodium thiocyanate was 6.6 l.; this includes the total excess extracellular fluid and the excess fluid of the blood. Subtracting the probable excess fluid in the blood due to the hypervolemia of polycythemia, the figures indicate approximately 6.0 l. of edema fluid.

paracentesis was performed on May 23, with the removal of 1800 cc. of clear yellow fluid. The specific gravity of the fluid was 1.015 and the protein content 2.8 gm per 100 cc. Following paracentesis the liver was found to be tender and enlarged several centimeters below the costal margin. The spleen was also palpable 3 cm below the costal margin. Two days later painful tender nodules were noted along the course of the veins of the right calf. Distended veins appeared over the lower thorax anteriorly and the upper abdomen. At this time a visiting physician suggested the diagnosis of thrombophlebitis of the iliac veins, of the inferior vena cava below the level of the kidneys and of the portal vein, all probably associated with polycythemia vera. The temperature, which had been normal during the first 7 days, commenced to rise. The patient lost all desire for food, commenced to vomit, developed moderate jaundice and rapidly became comatose. He died on the 9th day.

**Postmortem Examination (A-38-46)** This was performed half an hour after death. The peritoneal cavity contained approximately 500 cc. of clear, deeply bile stained fluid. The liver was slightly enlarged, the lower edge extending 2 cm below the costal margin; it weighed 2140 gm. The greater portion of the right lobe was swollen and poorly demarcated. The caudate lobe was anomalous, appearing as two curved finger like masses. There were some old fibrous adhesions between the under surface of the right lobe and the duodenum, elsewhere the capsule was smooth and glistening. Sections through the liver revealed the previously described swollen portion of the right lobe as consisting of a fatty yellowish tissue poorly demarcated from the normal brownish red liver tissue in the rest of the lobe. The entire caudate lobe showed the same swelling and fatty changes, but the left lobe was apparently not involved in the degenerative process. Approximately three quarters of all the liver tissue shared the degenerative changes grossly. In the right lobe, a little below the capsule, there were found two irregular sharply defined firm, yellowish white, smooth, somewhat hyaline masses, each about 2.5 by 1 by 1.5 cm. These appeared to be healed infarcts. The hepatic veins in the entire right and caudate lobes were thrombosed, all the small and medium sized branches being involved. The thrombi in the smaller peripheral veins completely occluded the vessel lumens, and were adherent to the walls. All were red, and in most cases soft in consistence; a few were firm and apparently organizing. In the larger, more proximal veins the thrombi were a deeper red and soft. Although most of these larger vessels were completely occluded by the thrombi, an occasional vein showed only partial occlusion with thrombi which were not firmly attached to the vessel wall. The thrombotic process was continuous from the smaller vessels to the entrance of the hepatic vein into the vena cava, a small thrombus occurring also in this latter vessel, but not occluding it. The thromboses in the right lobe were situated in areas of necrosis and in the remaining normal-appearing areas. None were found in the left lobe of the liver. The intrahepatic and extrahepatic bile ducts were not remarkable. The branches of the portal vein within the liver were entirely free of thrombi and not unusual.

There was marked dilatation of many of the branches of the portal veins outside the liver, particularly those in the mesentery of the small intestine. Many dilated veins were also found on the peritoneal surface of the anterior abdominal wall. The inferior vena cava was not dilated and, except for the area about the insertion of the hepatic veins, was free of thrombi.

The spleen was greatly enlarged, weighing 980 gm. It

was dark purplish red and firm in consistence. Sections through the spleen revealed a congested pulp.

The other gross findings consisted of congestion of the lungs and a deep purplish red, cellular bone marrow.

Many sections taken from representative portions of all lobes of the liver, including the areas which grossly appeared to be unaffected, revealed essentially the same process, varying only in intensity. The process consisted of central necrosis and degeneration, so extensive in some areas that the necrotic areas were confluent, leaving only scattered small areas of relatively normal liver cords around the portal spaces. In the zone between the necrotic and intact areas, the liver cords showed degenerative changes with granular deposition and vacuolization within the cell cytoplasm. Inflammatory cells, predominately lymphocytes and some polymorphonuclear neutrophilic cells, infiltrated these areas of necrosis, and slight hemorrhage was present in a few places. The stroma was better preserved and, in some lobules, showed condensation, bringing the portal areas in closer proximity than is usually found. Fibrosis was noted in only one area. The capsule of the liver was irregular and slightly thickened, with slight fibrin deposition and a few red blood cells on the surface. Bile pigment was found in the canaliculi, the latter showing no evidence of distention. Pigment deposits were also noted in the areas of necrosis. Most of the central and large hepatic veins in all the sections of liver were completely thrombosed. In scattered areas where hepatic veins were seen to be giving off branches it was apparent that the thrombi in the large vessels were older and appeared to be propagating themselves into the small veins. The extent of the liver necrosis varied as the number of vessels thrombosed. Some of the thrombi appeared to be loosely bound to the vessel wall by fibrin meshes, while many showed advanced states of organization with endothelial proliferation, most of them were made up of red blood cells, a few white blood cells and fibrin. There was a notable absence of platelets, and no lines of Zahn were noted. While the majority of the thrombi were of the red variety, a few of the mixed type were noted. The walls of the veins involved were edematous, infiltrated with fibrin and contained variable numbers of inflammatory cells. The portal veins, in contrast, were free of thrombi, definitely dilated, and in most instances filled with serum containing a few cells. A few of the portal veins were packed with red blood cells. The principal lesion consisted of widespread thrombosis of the hepatic veins and small tributaries, with extensive necrosis of the liver substance.

The lungs showed generalized vascular congestion. Small patchy areas of pneumonitis were scattered about, while many small bronchi were filled with pus. Areas of emphysema adjoining small atelectatic patches were found near the pleural surfaces. All sections of the lungs contained a few small veins and an occasional artery which showed thrombosis, in various stages of organization, most of them were, however, recent. Only one of these thrombi showed recanalization. Some of the small arteries showed endarteritis.

The spleen displayed marked congestion with increased fibrous tissue in the pulp. A slight eosinophilia was present. The kidneys exhibited the earliest stages of arteriolar sclerosis, with hyaline patches noted in the walls of the afferent arterioles. The kidneys and adrenals were congested. The prostate showed hyperplasia of the epithelial elements. The bone marrow had an increased number of islands of normoblasts; a few collections of myeloblasts were also noted. The other organs were all essentially negative.

## DISCUSSION

The clinical picture of thrombophlebitis of the hepatic veins is fairly well defined. Thompson and Turnbull<sup>19</sup> have divided the cases into two main groups. In some patients the onset is gradual after a period of premonitory epigastric pain. Ascites and a large tender liver develop, the former recurring after repeated paracenteses, and the superficial veins of the chest and abdomen dilate. Vomiting is common. Jaundice is not prominent. Death ensues in one to six months from slowly progressive hepatic failure. In other cases the course of the disease is shortened to a week or less. Coma and delirium are of frequent occurrence in this group of cases. Rarely, life is prolonged for many years. Hutchison and Simpson<sup>10</sup> described a patient who lived a fairly comfortable life for twenty-five years after the apparent onset of primary hepatic vein thrombosis, dying after exploratory laparotomy.

The development of splenomegaly in this syndrome is due to changes in the dynamics of hepatic flow following hepatic vein thrombosis; these probably also contribute to the development of hepatomegaly. In the normal individual the hepatic artery and portal vein are both afferent vessels, and the hepatic veins efferent. Following closure of the hepatic veins, however, the normal egress of blood from the liver is prevented. Marked portal congestion ensues, with the appearance of splenomegaly and dilated abdominal veins. Some portions of the portal system may actually take over the efferent function. The enlargement of the liver is due largely to engorgement with blood, for at autopsy, after the blood has run out of it, the liver has almost uniformly been found much smaller than normal. In the case here reported, however, a considerable amount of swelling was due to degenerative changes in the liver parenchyma. It is possible that if the patient had lived longer the liver might have become markedly atrophied as in most other reported cases. A similar sequence of events occurs in acute hepatitis.

This syndrome may be confused with cirrhosis of the liver, acute hepatitis or thrombosis of the splenic vein. It is distinguished from the first in many cases by the rapid onset, and in most by a tender, enlarged liver. By the time the spleen becomes considerably enlarged in cirrhosis of the liver, the latter organ is usually quite small and rarely tender. The absence of marked jaundice differentiates Chiari's syndrome and acute hepatitis. Splenic-vein thrombosis may be differentiated by the occurrence of left upper-quadrant pain, frequently of a severe degree. The liver is usually not enlarged and is rarely tender. In the

case here reported the finding of evidence of thrombophlebitis in the legs led to a diagnosis of visceral thrombophlebitis, although the exact site of these internal thromboses was not recognized during life. The early prominence of edema of the ankles in our case was probably due to thrombophlebitis of the veins of the legs.

The widespread occurrence of thrombotic processes may have been associated with the extremely high platelet count found in this patient with polycythemia vera, although it is to be noted that the thrombi contained only a very few platelets. It is impossible to define exactly the sequence of events which led to the development of extensive hepatic-vein thrombosis. It is possible that some localized process in the liver resulted in a purely local thrombosis which, in the presence of a greatly increased tendency toward clotting associated with the blood changes and also the slow blood flow of polycythemia, may have rapidly propagated itself to adjacent areas. As successive portions of the liver parenchyma were involved, secondary centers in which venous thromboses were occurring and from which they were spreading may have been established. It is of interest in this connection that one week before admission to the hospital the patient experienced severe pain in the flanks, possibly due to the development of the infarcts found at autopsy. Three days later ascites appeared and a week later jaundice and acidosis, as the hepatic-vein thrombosis spread and parenchymal degeneration developed.

Although the patient died before chemical studies of the blood could be completed, certain changes were noted. Diminished total cholesterol and cholesterol-ester contents of the blood were found, as in the case described by Sohval,<sup>17</sup> even before the development of clinically appreciable jaundice. These are to be ascribed, as pointed out by a number of authors,<sup>1, 7, 8, 18</sup> to widespread liver cell damage. The rise in blood nonprotein-nitrogen concentration is to be ascribed to the development of the toxic nephritis commonly seen in patients with jaundice and severe liver damage. Jacobson and Goodpasture<sup>11</sup> noted the rapid development of severe acidosis in a case of thrombosis of the hepatic veins observed by them.

The changes in the liver which occur in cases with Chiari's syndrome resemble those found in the liver in those with severe congestive heart failure. These changes consist in marked engorgement of the sinusoids of the liver, with degeneration and necrosis of the liver cells in the central portion of the lobule. The involvement of each lobule in the degenerative process is much more extensive in Chiari's syndrome than it is in congestive failure, so that, as in the case reported

here, the hepatic picture approaches that of acute yellow atrophy. Most patients with thrombophlebitis of the hepatic veins do not live long enough to develop extensive fibrotic changes in the liver. The patient reported by Hutchison and Simpson,<sup>10</sup> however, lived twenty-five years after the apparent onset of the thrombotic process in his hepatic veins and at autopsy showed central or cardiac cirrhosis of the liver.

## SUMMARY

Chiari's syndrome, thrombophlebitis of the hepatic veins, may be primary or secondary to a variety of conditions, including, as in the case reported here, polycythemia vera. The clinical, blood chemical and pathological findings are described, and the differential diagnosis discussed.

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## NATIONAL AND STATE PROGRAM FOR TUBERCULOSIS CONTROL\*

## Presidential Address

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NOTABLE progress has recently been made in arousing national interest in the adoption of measures for the prevention and control of tuberculosis. Before discussing these matters, it is desirable to consider the problem as it presents itself in the country as a whole.

## TUBERCULOSIS AS A PUBLIC-HEALTH PROBLEM

There has been a consistent decline in the death rate from tuberculosis in the United States from nearly 200 per 100,000 population in 1900 to a probable rate of below 50 for the year 1938. During 1936, for which returns<sup>1</sup> are available, there were 71,527 deaths from tuberculosis—a rate of 557 per 100,000 population. With this number of deaths, it may be estimated that there were at least five times this number of living persons with the disease. It ranked seventh among the leading causes of death without regard to age groups, and first in the most useful and productive

period of life, from fifteen to forty-five years of age.

Tuberculosis control is an expensive public-health project. Considering only institutional provision for the disease, the replacement value of land, buildings and equipment for sanatoriums, tuberculosis departments and preventoriums in the country is estimated by the Council on Medical Education and Hospitals of the American Medical Association<sup>2</sup> at \$328,937,777, and the annual maintenance cost for these services at approximately \$75,906,582.

Though its incidence is steadily diminishing, tuberculosis is still one of the most pressing problems confronting the Nation because of its seriousness and its preventable character.

The favorable trend in the tuberculosis death rate throughout the United States is for the most part, to be ascribed on the one hand to improvement in economic status and better housing and dietary standards, and on the other to a diminishing amount of community infection in consequence of education, case-finding and hospitaliza-

\* Presidential address delivered on March 30, 1939, at the annual meeting of the Massachusetts Tuberculosis League, Boston.

tion As these factors are to a considerable extent within our control, there is a prospect of the practical elimination of the disease as a serious public-health problem

#### REGIONAL VARIATIONS IN THE PROBLEM

The varying magnitude of the problem is apparent when political subdivisions are ranked in accordance with the tuberculosis death rates in 1936. Porto Rico heads the list<sup>3</sup> with a rate of 297.9 and is followed by Arizona (274.6), New Mexico (122.0), District of Columbia (106.1), Tennessee (89.6), Nevada (88.0), Hawaii (85.6), Maryland (85.2), Colorado (76.3) and California (76.2). Without mentioning the states in the intermediate group, an enviable position at the bottom of the list is taken by New Hampshire (33.7), Kansas (28.7), North Dakota (24.9), Idaho (24.7), Iowa (23.8), Utah (21.5), Nebraska (18.3) and finally Wyoming (18.0). The Commonwealth of Massachusetts in 1936 was in thirty-second place among the states in the Union. In 1938, there were 1543 deaths from the pulmonary form of the disease, a rate of 34.9. Deaths from extrapulmonary cases numbered 141, a rate of 3.2. The death rate from all forms in 1938 was therefore 38.1.

The tuberculosis death rate is high in the Negro population, in whom the disease ranks second as a cause of death. The problem is in consequence especially serious in the South.

A high death rate from tuberculosis among Spanish Americans and Mexicans living in the United States is partly responsible for the excessively high rates in some of the counties in Texas, Colorado, New Mexico, Arizona and California.<sup>4</sup>

Migration from one state to another plays a part in the uneven distribution of the disease. Such resort states as Arizona, New Mexico and Colorado are in consequence confronted with an especially difficult problem. Interchange between the states of persons with tuberculosis is to a less extent a problem in all parts of the Union.

Adequate tuberculosis control is in large measure an economic problem, inasmuch as it is concerned with standards of living and the application of measures for diminishing the amount of community infection. Financial resources vary widely among the states. Case-finding facilities and hospitalization of the tuberculous are important factors in control of the disease. A provision of at least two beds per annual death is desirable.

The Technical Committee on Medical Care in its report<sup>5</sup> to the National Health Conference at Washington estimates the ratio of beds per annual death for the United States as a whole at 1.15, with variation for individual states from 2.75 to

0.20. Only five states have two or more beds per annual death, and in twenty-six states the figure is less than one. Nine states make no legal provision for sanatoriums. Five of these subsidize care at local institutions, and four make no statewide provision for the hospitalization of patients.

The South with its large Negro population is under a serious economic handicap and makes little provision for tuberculosis control.

#### NATION-WIDE TUBERCULOSIS PROGRAM

Tuberculosis control in the United States falls short of an attainable goal. This is due in part to economic factors and in part to lack of understanding, acceptance and application on the part of the public, the medical profession and official agencies of remedial measures. In communities such as Massachusetts, where the facilities are adequate, the problem is largely educational and for its solution demands more widespread support of the program. In many communities, and especially in the South, the situation is more serious on account of the lack of diagnostic facilities and opportunity for adequate institutional care.

It may be assumed that further substantial progress in tuberculosis control will not be accomplished without the inauguration of a uniform and adequate program throughout the country as a whole. Leadership and financial assistance in the solution of the problem should come from the central government at Washington, leaving the actual operation of the project to states and localities.

A nation-wide program for the prevention and control of tuberculosis was formulated by a special committee of the board of directors of the National Tuberculosis Association, and was approved on June 20, 1938.<sup>6</sup>

At the National Health Conference in Washington, July 18-20, 1938, the Interdepartmental Committee presented a national health program. Only that part of the program dealing with tuberculosis need be considered here. The Technical Committee on Medical Care<sup>7</sup> reported in connection with the expansion of general public-health service the need for a concerted attack on certain specific problems of national health, including tuberculosis. It recommended case-finding, especially by x-ray examination of contacts of known cases, isolation and treatment (usually bed care) of persons with active disease and periodic observation of those with latent or quiescent disease.

A draft of a proposed bill imposing additional duties on the United States Public Health Service with respect to tuberculosis control was presented by Mr. Folks at the meeting of the board of directors of the National Tuberculosis Asso-

ciation, February 11, 1939, and was approved in principle as a working basis for federal provision. It is in substance as follows:

The recommendation is made that measures for the prevention and control of tuberculosis be established, extended and improved in the political subdivisions of the United States, especially in those with high death rates from the disease and those suffering from severe economic distress, that studies, investigations and demonstrations be conducted and that personnel be trained to accomplish these purposes.

To carry out this project, it is suggested that Congress authorize the appropriation of funds to be made available and allotted through the United States Public Health Service to political subdivisions on the basis of the population, extent of the problem, existing facilities and financial needs and in accordance with plans presented by the local health authority and approved by the Surgeon General.

It is suggested further that after consultation with the state and territorial health officers the Surgeon General of the United States Public Health Service be authorized to prescribe the rules and regulations necessary to carry out the plan and that a Division of Tuberculosis Control be established in the United States Public Health Service. The bill suggests for the year ending June 30, 1940, an appropriation of a sum not to exceed \$7,750,000, for the year ending June 30, 1941, of a sum not to exceed \$33,500,000, for the year ending June 30, 1942, of a sum not to exceed \$37,000,000, and for each year thereafter of such sum as may be deemed necessary to carry out the purpose of this act, provided that subsequent to the year 1945 the sum shall not exceed \$17,500,000.

The Wagner Bill (Senate 1620) was introduced to be enacted as the National Health Act of 1939, as an amendment to the Social Security Act to carry out some of the purposes of the National Health Program, outlined at the Washington conference. It recommends the provision of more adequate public-health service, prevention and control of disease, maternal and child-health services, construction and maintenance of needed hospitals and health centers, care of the sick, disability insurance and the training of personnel. It advocates the appropriation of certain sums for public health work and investigation, and grants to states for hospitals and health centers for the control of tuberculosis, among other projects. The provisions of the bill in its wider scope are much the same in principle as suggested by the National Tuberculosis Association with respect to tuberculosis control. In addition, however, the Wagner Bill requires financial participation by the states and provides for federal and local advisory councils.

The sums specified for public health and medical care in the Wagner Bill are to be allotted to political subdivisions on a matching basis, the highest proportion, two thirds, being applicable to the state with the lowest financial resources, and the lowest, one third, to the state with the high-

est financial resources. The expenditure of federal funds would amount to nearly \$100,000,000 for the first year, without any specific sums being mentioned for mental disease and tuberculosis hospitals, with gradual increases thereafter. With respect to mental disease and tuberculosis hospitals, there is authorized to be appropriated "a sum sufficient to carry out, in respect to such hospitals, the purposes of this title."

Without attempting to pass judgment on the Wagner Bill or to discuss the relative merits of the different phases of the National Health Program, it is obvious that tuberculosis control is one of the most urgent of them all.

A nation-wide tuberculosis program should include the provision of hospital care for all discovered cases needing such care and case-finding, including x-ray examination of those exposed to the disease by family contact.

#### NECESSARY HOSPITAL BEDS

Estimate of the number of necessary hospital beds for patients with tuberculosis is based on the desirable ratio of two beds per annual death. In addition to the beds already available, it is estimated by the National Tuberculosis Association that about 40,000 beds are needed for tuberculosis.

With respect to the recommendation of the Technical Committee on Medical Care at the National Health Conference<sup>5</sup> that in a ten-year period hospital facilities should be expanded by the provision of 360,000 beds in general, tuberculosis and mental disease hospitals, Fishbein<sup>7</sup> has made the criticism that hospitals in the United States have been for the past five or six years from 25 to 35 per cent unoccupied. It is also stated regarding general hospitals of the country in 1938 that 31.1 per cent of the beds were unused.<sup>8</sup>

It should be noted, however, with respect to tuberculosis hospitals, which alone are under discussion here, that in a census<sup>2</sup> covering 92,339 beds for tuberculosis patients there were 13,571 vacancies (14.7 per cent) and at the same time a waiting list of 9854 patients. This unequal distribution in patient load may be taken to indicate regional variation in the pressure for beds.

So far as tuberculosis is concerned, it is obvious that the number of available beds has a wide regional variation and is not high enough in the country as a whole. Nevertheless, before embarking on an expensive building program for additional beds for tuberculosis or other purposes it is of course desirable to determine to what extent existing facilities are or can be made available.

In view of the probable continuance of the decline of tuberculosis as a public health prob-

lem, it is appreciated that the additional beds will not be needed for the project permanently, and that they should be so constructed and located that they can be used later for general or other hospital purposes

There are nearly three beds per annual death of pulmonary cases in public and private sanatoriums in Massachusetts. The ratio in Massachusetts is exceeded in only few states in the Union and is sufficient for present needs

#### CASE-FINDING PROGRAM

In case-finding, the most important method is the x-ray examination of all family contacts of known cases of tuberculosis. The proportion of cases among contacts is larger than it is in any other group. The extent of the case-finding problem in any community may be roughly estimated by multiplying the number of annual deaths from tuberculosis by the number of discoverable cases, using 5 cases per death as the number which can be discovered, and multiplying this result by the estimated number of exposed persons, or 24 per family.

Persons reported as dying of tuberculosis, patients in tuberculosis sanatoriums and those with tuberculosis in the practice of physicians are among the groups to which recourse may be had in the case-finding program, and each case so located may serve as the starting point for the investigation of family contacts.

In Massachusetts, tuberculosis, in all its forms, is among the diseases declared dangerous to the public health and reportable through local boards of health to the State Department of Public Health. An exception, however, is made with respect to the childhood type of tuberculosis, concerning which a report from the local board of health to the department is made only when sanatorium treatment is recommended.

It should be noted that, so far as Massachusetts is concerned, the Department of Public Health has recently promulgated rules and regulations which, when carried out, will put this case-finding program into operation. These revised regulations<sup>9</sup> are in part as follows:

As soon as a diagnosis of tuberculosis has been established, arrangements should be made for the examination, including an x-ray of the chest, of all members of the immediate family and of other persons with whom the patient has been in close contact. If the family cannot afford x-ray examination by a private physician, facilities are available through the various state, county and municipal sanatoriums. Persons with suspicious findings and those who have had contact with a tuberculous patient should be kept under medical observation as long as advised by the physician.

It is fortunate that facilities for this case finding program are already available in Massachusetts. Since 1931, when the state and county sanatoriums were authorized to extend their services by the maintenance of diagnostic outpatient departments at the request of towns or groups of towns, twenty-two extramural consultation clinics have been established. These clinics furnish diagnostic service through members of the staff of the sanatoriums. They are for the most part in outpatient departments of general hospitals, are provided with x-ray facilities and are available for those who cannot afford to pay.

According to the policies<sup>9</sup> of the Massachusetts Department of Public Health, "It is the responsibility of the local board of health to provide hospital care for cases of tuberculosis when needed, and to see that contacts are examined where such examination cannot be made through a private physician."

With abundant facilities available and plans definitely outlined, there should be an improvement in the case-finding program in Massachusetts. A large proportion of the family contacts of patients in the state and county sanatoriums are now examined by x-ray, but the percentage should be increased in some parts of the State.

In some of the municipal sanatoriums, x-ray examination is likewise made of a considerable proportion of the family contacts. But there is need for improvement in these institutions in the extension of the investigation to include all family contacts. Lack of adequate facilities is in part responsible for the incompleteness of the case-finding program. This difficulty can be surmounted by making use of the services of the state and county sanatoriums.

Case-finding in school children has been in operation since 1924. The school program suffers from failure to secure parental consent for the investigation of more than 50 to 60 per cent of the children. The advantages of the finding of tuberculosis in school children are twofold—to the affected child and to the community. Yet these advantages are fully realized only when the investigation includes both children and family contacts. In general, little has thus far been done to round out this part of the program and to examine by x-ray the family contacts of the children with the childhood (hilus) as well as the adult type of tuberculosis.

The examination of a larger proportion of the family contacts of tuberculous patients in the practice of physicians may be promoted by local boards of health through a circular letter to physicians asking for a list of all tuberculous patients under their care during the year, whether or not previously



reported, emphasizing the importance of sputum examination in suspicious cases, calling attention to the availability of the State Bacteriological Laboratory or other approved laboratories, noting the importance of the x-ray in the early diagnosis of the disease and listing the facilities in the State for the x-ray examination of patients and contacts unable to pay

Group investigation in Massachusetts should be extended to include all teachers, medical students, hospital interns and nurses, college students, diabetic patients, and nursemaids and domestic help in homes where there are children

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## REPORT ON MEDICAL PROGRESS

### PATHOLOGY

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BOSTON

**T**O REVIEW, in a few pages, progress in pathology, the least specialized and most inclusive division of medicine, is a manifest impossibility. Probably the editor consciously or subconsciously realized this in assigning to a score of reviewers in this series so many of the choicest items on the pathologic bill of fare that little is left to the pathologist save morbid anatomy in the strictest sense and experimental work in fields still devoid of practical clinical application. Even so, the field remains enormous and a purely arbitrary selection must be made. Several subjects stand out as worthy of brief review because the work of several investigators with varying viewpoints and technics has focused closely enough to permit comparison. Progress is not always easy to distinguish from regress, and in the assessment of rival claims it seems most honest to make no attempt to conceal one's inevitable bias.

#### ARTERIOSCLEROSIS

In the last five years there has been in this country a recrudescence of lively interest in the subject of arteriosclerosis. In a series of papers documented by numerous photomicrographs of exceptional clarity, Leary<sup>1-3</sup> has compared in detail human lesions with the experimental ones so readily produced in rabbits by the feeding of diets rich in cholesterol. In the rabbit it can be shown that in the process of cholesterol deposit fibroblasts are stimulated to multiply and to lay down collagen. With withdrawal of the cholesterol from the diet the lipid gradually disappears from the

vessel but the fibrous intimal thickening persists. By such methods every phase of the human disease can be accurately mimicked. Leary feels that he has demonstrated so close a similarity in the lesions in the two species that one is justified in considering them identical in pathogenesis, and on this ground he advances the hypothesis that human arteriosclerosis is dependent on an abnormality of the cholesterol metabolism. He admits, but does not stress, the importance of local vascular phenomena in determining the localization of the deposits. In subsequent communications he has somewhat qualified this conclusion, admitting that the disorder in cholesterol metabolism may be local rather than general.

Duff,<sup>4, 5</sup> in contrast, finds slight but undeniable differences between the rabbit and human lesions, particularly in an early involvement of the media in the experimental lesions which is lacking in the human disease. He presents evidence of preliminary degenerative change in the arterial walls before cholesterol is deposited, and believes that hypercholesterolemia alone will not give rise to atheroma. He emphasizes the lack of clinical or extravascular histological evidence of disordered cholesterol metabolism in the human disease except in relation to diabetes, where the disturbance of metabolism is so extensive that many other factors besides the hypercholesterolemia may be responsible for the initiation of the lesion. He calls attention once again to the well-known fact that premature arteriosclerosis has never been experimentally produced by cholesterol feeding or in any other way in omnivorous animals which spontane-

\*Assistant professor of pathology Harvard Medical School director Department of Pathology and Bacteriology Massachusetts General Hospital.

ously develop the disease at advanced ages, and wisely advises caution in applying to man a conclusion which seems self-evident from a study of the artificial rabbit disease

Experimental rabbit atherosclerosis remains, however, a fascinating tool for the investigative pathologist. Systematically the variations are being played, testing, for instance, one after another endocrine gland to determine whether over- or underfunction will accelerate or decrease the rate of development of vascular lesions. To date the most consistent results relate to the thyroid,<sup>6</sup> where hyperthyroidism is generally agreed to delay the appearance of atheroma and hypothyroidism to accelerate and accentuate it—a point not to be forgotten before recommending total thyroidectomy for the relief of angina pectoris. Such substances as thyrotropic pituitary hormone<sup>7</sup> and potassium iodide,<sup>8, 9</sup> the effects of which on experimental atheroma are notably variable, can fairly safely be assumed to act through the mediation of altered thyroid function. Physicians with the requisite philosophy may find complacency in the experiments of Eberhard,<sup>9</sup> who demonstrated that though alcohol ingested along with cholesterol raised the level of blood cholesterol, it delayed the deposit of the lipid in the blood vessels.

A new angle of attack on the problem has been developed and energetically pursued under the direction of Winternitz at Yale University. With various collaborators he has made an extensive study of the vasa vasorum of the aorta and various major vessels, such as the coronary and renal arteries, under normal and pathologic conditions. The results of this work have been summarized in a monograph rather broadly entitled *The Biology of Arteriosclerosis*<sup>10</sup> replete with colored illustrations which support the author's points with convincing clarity and esthetic charm. Conservative in positive statement, it is presented in a manner which permits almost limitless implications. Although vascularization of atherosclerotic plaques has been repeatedly noted by previous investigators, its extent has certainly never been so vividly demonstrated. A critical study of both the illustrations and the text, however, leaves little doubt that the great majority of lesions studied must be classified as advanced and as derived from vessels with long-standing disease. Convincing evidence that in normal human arteries the vasa vasorum extend into the intima, or even with significant frequency into the inner third of the media, is lacking. Under such conditions it is difficult to believe that lesions of the vasa vasorum can initiate atherosclerotic plaques, which all evidence indicates are, primarily, intimal lesions.

The subintimal hemorrhages which the author finds with such frequency by his method of clearing vessels with the Spaltholz method are of interest and have undoubtedly been neglected by most previous investigators. Though hemorrhages may evidently be invisible beneath a thickened opaque intima, it seems scarcely possible that they could be missed by any method of examination in a vessel with an intima of normal thickness which is almost perfectly transparent. It seems doubtful, therefore, that such hemorrhages can, as Winternitz suggests, be a significant factor in the initiation of atherosclerotic lesions. That they may, however, play a vital role in the disruption of established atheromatous plaques and in the initiation of thrombosis seems more probable. This possibility has been emphasized by Paterson,<sup>11, 12</sup> who found intimal hemorrhages arising, he believes, from the vasa vasorum in 32 of 37 consecutive cases of coronary thrombosis. Continued extensive investigation by a variety of methods will be necessary to establish the validity of this hypothesis as against Leary's theory of the anemic necrosis of the thickened avascular intima. The application of Winternitz's technic to the study of experimental atheroma might go far in answering some of these questions. On all investigators working with human material the importance of establishing adequate criteria for determining the age of the lesions under observation, and the particular importance of studying early lesions should be urged.

#### CORONARY SCLEROSIS AND INFARCTION OF THE HEART

The correlation of infarction of the myocardium with occlusion of the coronary artery is often difficult or even impossible under the conditions of a routine autopsy. All pathologists frequently see thromboses unassociated with infarction, and acute infarcts associated with a vessel so completely fibrosed and calcified that it must have been occluded years before. The existence of collateral circulation has, of course, been inferred in order to get them out of their difficulty. More precise information in regard to this collateral has been accumulating rapidly in recent years. By extreme care and thoroughness in the gross examination of the coronary circulation, Saphir and his collaborators<sup>13</sup> were able to show that infarction of the myocardium rarely develops when a single coronary branch is occluded unless there is simultaneous or pre-existing partial or complete obliteration of other branches as well. An acute infarct, for instance, may be found in the area normally supplied by the descending branch of the left coronary, this vessel will show an old occlusion, but with sufficient care a fresh occlusion can always be found.

elsewhere, perhaps in one of the branches of the right coronary artery which has for years been supplying a collateral circulation. Though collateral circulation may safely be inferred from such observations, it cannot ordinarily be demonstrated by simple methods of gross dissection. A notable advance, therefore, is represented by the recent work of Schlesinger.<sup>14</sup> He uses a new injection mass of agar and lead salts which permits a very uniform injection of the arterial tree down to arterioles of 40 microns in diameter. He has in addition developed a new technic for opening, or rather unrolling, the heart which without cutting across any important vessels enables one to spread out the entire heart in one plane. This enormously improves the radiographic visualization. With this method Schlesinger has found in truly normal hearts no anastomoses large enough to permit the passage of his injection mass. In diseased hearts of various types they are frequently found, and in cases of coronary sclerosis they can be readily demonstrated whenever arteriosclerotic narrowing or occlusion causes obstruction in the coronary circulation. This extensive spontaneous development of collateral circulation should be borne in mind in interpreting the results of operations designed to produce artificially such a collateral circulation.

#### LUNGS

A point of minute anatomy in the lungs which is of great theoretical importance to the pathologist seems finally to have been settled after years of dispute with the histologist. This concerns the existence of pores of Cohn in normal lungs. Macklin,<sup>15</sup> by a study of very thick lung sections in which many alveolar walls were viewed from their flattened surfaces rather than in ordinary sections, was able to show obvious communications between alveoli in various animals and in man. Though present at all ages, they become larger and more numerous with advancing age. Loosh<sup>16</sup> has confirmed this finding by the method of serial sections, in an article documented by photomicrography of exceptional clarity and detail. Their minute size, 5 or 10 microns, explains why they were missed in previous reconstructions. The importance of such interalveolar air channels in explaining the relation of bronchial plugging to atelectasis and the mode of spread of infection throughout a lobe are obvious.

In the field of pulmonary neoplasm, more and more attention is being given by bronchoscopists, thoracic surgeons and pathologists to those peculiar semi-benign bronchial tumors which have generally in this country been called adenomas. It is evident that in some clinics they are even yet not

distinguished from carcinoma. Though locally infiltrative and unquestionably capable of metastasis to regional nodes, their progress is so slow and the likelihood of generalized metastasis so slight that they deserve to be sharply distinguished. Attempts to explain their histology have been numerous and unsatisfactory. We and Graham<sup>17</sup> have recently proposed that they are mixed tumors and should be included with hamartomas. Hamperl<sup>18</sup> in contrast points out the remarkable histological and clinical similarity to the argentaffine tumors of the intestine ordinarily called carcinoids. Decision upon a point of pathogenesis must rest primarily upon accurate histologic observation, the first prerequisite of which is good histologic technic. A glance at the photomicrographs accompanying the review would suffice to explain why the reviewer is prejudiced in favor of Hamperl despite the unfortunate failure of all investigators to demonstrate that the cells are argentaffine.

The development by Robertson and his co-workers<sup>19-22</sup> a few years ago of a reliable method of producing pneumococcal lobar pneumonia in the rat has added much to our knowledge of the pathologic lesions of pneumonia. The study of a large number of experimental lesions and their comparison with human material have made it apparent that lobar pneumonia ordinarily starts as a focus of parenchymal infection near the periphery of a lobe. Spread occurs via the air spaces and the pores of Cohn, and Blake and Cecil's<sup>23</sup> theory of lymphatic extension has been supported. Loeschcke<sup>24</sup> from a very careful study of extensive human material had already reached the same conclusions, and his findings are in close agreement with those of Robertson.

In a continuation of these studies Robertson and his associates<sup>25-28</sup> have shown clearly that recovery from pneumonia depends on a dual mechanism: first, a generalized process which acts to localize the infection and prevent or control invasion of the blood stream, and second, a local process by which the lesion itself is finally freed from the organisms. To a large extent these processes appear to be independent of each other. The generalized element is the familiar process of phagocyte formation, the local one is a tissue reaction within the lung itself. The outstanding feature of the latter is a macrophage reaction which appears about the fortieth hour even in animals which may eventually succumb to bacteremia. With the onset of this macrophage reaction the lungs rapidly become sterile and pneumococci, if found at all, are almost entirely intracellular. It is possible for such a macrophage reaction to sterilize one lobe while active progression of

fection is occurring in other lobes. The persistence and even occasional extension of consolidation following apparent symptomatic cure by serotherapy are explained by this independence of the two reactions. They will soon have to be carefully evaluated in relation to chemotherapy.

#### TUBERCULOSIS

In no field of pathology is progress more difficult to assess than in tuberculosis, particularly its experimental aspects. Hardly an experiment can be recorded for which in the ensuing years refutations do not outnumber the confirmations. Uncontrolled—perhaps uncontrollable—variations in dosage, virulence, natural host resistance, time of observation, dietary factors and complications of intercurrent disease render the same experiment in two investigators' hands barely comparable. It may be of value to point out some of these conflicting results and so drive home the need of deliberation in the acceptance of any experimental results in this field.

One of the sources of liveliest debate has been the relation of allergy to immunity. Rich<sup>27, 28</sup> and Cannon and Hartley<sup>29</sup> among others, have shown clearly that allergic inflammation fails to localize a virulent pyogenic organism such as the pneumococcus. This of course does not prove that it may not localize tubercle bacilli. Apparently conclusive evidence that also in tuberculosis immunity can be separated from allergy was presented by Rothschild, Friedenwald and Bernstein<sup>30</sup> when they showed that infected animals desensitized with tuberculin showed less extensive tuberculosis two months after re-infection than did allergic animals or normal controls. Although this conclusion was confirmed by Birkhaug<sup>31</sup> and various other investigators,<sup>32</sup> results pointing in the opposite direction were obtained by Willis and his collaborators<sup>33, 34</sup>. In an extensive experiment with over 500 animals they found that when the observations were carried beyond the sixty-day period used by Rothschild et al. the desensitized animals, although developing fewer tubercles in the liver and the spleen, died in large numbers of acute tuberculous pneumonia long before the allergic control animals. In all such experiments the repeated injections of large amounts of tuberculin necessary to keep the animals desensitized provoke fever, anorexia, loss of weight and the death of numerous animals either from shock or intercurrent disease, and the results are almost impossible to interpret. Moreover, the failure to evoke a skin reaction in such debilitated animals is by no means conclusive proof of complete desensitization.

Another subject which continues to be the source of a voluminous literature is the study of the factors underlying the formation of the tubercle and their relation to allergy. Under the aegis of the National Tuberculosis Association an extensive collaborative enterprise involving many laboratories and scores of workers has been centered about the chemical fractionation of the tubercle bacillus and the testing of the various separate and combined fractions histologically and immunologically. Many of the early results proved misleading or contradictory—first, because many of the earlier fractions tested were impure, secondly, because the significance of the degree of allergy was not always borne in mind, thirdly, because quantitative probabilities were not duly considered, and finally, because in the process of purification proteins have probably been chemically and antigenically altered. In Sabin's most recent publications<sup>35-39</sup> many of these conflicts appear to have been resolved. The carbohydrate fraction will not induce sensitivity and gives only an immediate polymorphonuclear type of skin reaction, the waxes provoke only nonspecific foreign-body reactions, the proteins will induce sensitivity and produce either polymorphonuclear or mononuclear response, dependent, as Dienes and Mallory<sup>40, 41</sup> pointed out for proteins in general, on dosage and degree of allergy, the phospholipids produce an accentuated mononuclear response with marked development of epithelioid cells. By combining phospholipid and protein, apparent true tubercle formation is induced and hypersensitivity greatly increased. The amount of phospholipid employed is still far greater than the dissolution of a reasonable number of tubercle bacilli would provide, and the reaction may not be entirely specific. An accentuation of hypersensitivity by the combination of tubercle bacilli or their derivatives with other fats and oils has been noted by Saenz<sup>42</sup> and others. Still more conducive to conservatism in attributing to specific organic chemical factors of the tubercle bacillus responsibility for the development of one or another feature of the exudative reaction is the demonstration by Gardner<sup>43</sup> that every phase of this reaction can be exactly duplicated by the injection of a simple inorganic substance, silicon dioxide.

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also associated with tuberculosis. These oval areas of rarefaction which simulate thin-walled chronic cavities are just as likely to be thickened pleural septa with areas of emphysematous lung between.

DR. SHORT: This represents an old process?

DR. HAMPTON: Yes, I think that everything we see in the chest is chronic. This shadow at the right base could be acute consolidation but it is seen in only one film and it is not plain. I do not see how we could make a diagnosis of active disease in his chest.

DR. SHORT: To save time I have decided to admit from the beginning that this patient had an infection with *Bacillus mucosus capsulatus* or Friedländer's bacillus. I can hardly believe that both the blood culture and urine culture represent contaminants, nor, since the blood culture was taken six days before the patient's death, do I think that the former could represent an antemortem invasion of the blood stream by essentially saprophytic organisms. Of course he may have had a combined infection, the picture is suggestive of acute miliary tuberculosis, with indefinite signs and lack of a definite x-ray picture in the lungs, and terminal meningitis. As Dr. Hampton said, there is possibly some evidence of an old tuberculous process in the chest. I do not believe we have enough positive findings to make that diagnosis and, therefore, we have to dismiss it. I do not see that any of the picture represents toxic symptoms from sulfapyridine, although he was given a large dose in the first twenty-four hours. There is no evidence of agranulocytosis or diminished resistance to infection and, surprisingly enough, no mention was made of his vomiting.

The points left for us to decide, then, are the primary source of the bacteremia and the organs of the body which were finally invaded. I think that from the negative x-ray of the chest and the lack of definite signs on physical examination we can rule out a primary pneumonia. The lung findings may represent either an old process, as Dr. Hampton suggests, or possibly an early metastatic infection in the lungs. According to the literature, extrapulmonary infections with this organism are not uncommon. Baehr, Schwartzman and Greenspan\* reported 198 cases from one hospital. Of these, nearly a third resulted from peritonitis following a perforation of the gastrointestinal tract. The next commonest source was the biliary tract or the liver, and the next the genitourinary tract. In these last two, stasis was a factor and there was often a bacteremia. There were very few cases originating in the middle ear or sinuses.

The onset of this patient's illness was certainly not very characteristic. It suggested a head cold until the development of chills and fever. I think a presumptive diagnosis of pneumonia was probably justified from the clinical picture in a man of his age. He apparently had jaundice on admission because of the finding of bile in the urine, although it was not noted in his skin or sclerae until a day or two before he died. I do not believe there is enough evidence for a primary infection in the liver or biliary tract. The jaundice is really the only thing we have pointing in that direction and it could just as well be a toxic hepatitis due to a generalized infection.

Then we come to the genitourinary tract. The patient died with a high nonprotein nitrogen in the blood serum. We are not told anything about the fluid intake or how much he vomited. Probably he did not take in very much in the last few days when he was in coma. The one examination of the urine hardly suggests a urinary-tract infection, but it does not rule it out. Of course, with a generalized infection, the positive urine cultures could be explained on the basis of excretion through the kidneys of the organisms in the blood stream. There is nothing to suggest that this patient had an already existing nephritis. He had a normal blood pressure and fairly good specific gravity of the urine. I shall have to assume that, unless the high nonprotein nitrogen was due to vomiting and dehydration, he did have a renal infection which was severe enough to destroy most of the functioning tissue in his kidneys. This may have been furthered by some unrecognized urinary obstruction, perhaps an enlarged prostate.

Terminally the patient had signs of meningitis. Of course, without lumbar puncture we have no way of knowing that he did not have an extradural abscess which may have given these signs with a sterile spinal fluid. To sum up, I think this patient had a generalized Friedländer's infection with bacteremia, with the primary source undetermined. We cannot say he had a primary pneumonia or primary infection in the biliary tract or liver. There is no real evidence of sinus or middle-ear infection. By elimination, a primary source in the urinary tract is most likely, resulting in a severe pyelonephritis, and finally the development of signs of meningitis.

#### CLINICAL DIAGNOSES

Friedländer's bacillus pneumonia  
Thrombosis of basilar artery?

#### DR. SHORT'S DIAGNOSES

Bacteremia, Friedländer's bacillus  
Pyelonephritis  
Meningitis

\*Baehr, G., Schwartzman, G., and Greenspan, E. B. Bacillus Friedländer infections. *Ann. Int. Med.* 10:1-58, 1901-1937.

## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 25251

#### PRESENTATION OF CASE

An eighty-three-year-old man was admitted complaining of chills and fever.

Six days before entry the patient noted the onset of a chilly sensation. His head felt big, and he had anorexia. He went to bed early, slept well, but woke the following morning and noticed increased perspiration. He had no appetite and remained in bed most of the day. His nose felt stuffed up, and his head full. Postnasal phlegm, which was worse when he had a cold, had been a chronic complaint for the past several years. His physician saw him on this second day of his illness and found a temperature of 98.6°F and a pulse of 72. There were a few rales at the bases of both lungs. The following day he had a chill followed by a temperature of 103°F and respirations of 30. Physical signs on examination of the lungs were indefinite. There was no pleural pain. The blood showed a white-cell count of 15,750 with 94 per cent polymorphonuclears. The blood pressure was 128 systolic, 60 diastolic. It was assumed that he had pneumonia, and 9.5 gm of sulfapyridine were given at four-hour intervals during the following twenty-four hours. Shortly after completion of this course of therapy he had another chill and his temperature rose to 101.6°F. A few hours later he was again given 2 gm of sulfapyridine, following which his temperature soon fell to 99.2°F. On examination the tongue and soft palate were red. The lungs showed no definite signs except for slight dullness at the right base and a few rales at the left base. Respirations were 30. On the following day he seemed better during the morning but in the afternoon again had a chill with a temperature rise to 101°F. An x-ray film of the chest, taken with a portable machine, showed no evidence of pneumonia. He had not had abdominal pain or tenderness, jaundice or urinary symptoms.

Physical examination on admission showed a well-developed and nourished, acutely ill man. There were a few rales at both lung bases. The blood pressure was 128 systolic, 60 diastolic. No other definite physical signs were noted.

The temperature was 100°F, the pulse 100, and the respirations 27.

Examination of the urine showed a specific gravity of 1.020, a trace of albumin, a slight trace of bile, many coarsely granular casts, rare cellular casts, 3 or 4 white cells and an occasional red cell per high-power field, no bacteria and no sugar. The blood showed a red-cell count of 4,520,000 with 90 per cent hemoglobin, and a white-cell count of 27,400 with 83 per cent polymorphonuclears, 4 per cent small lymphocytes, 11 per cent mononuclears, 1 per cent nucleated red cells and 1 per cent myelocytes. The red cells appeared fairly normal, there were rare polychromatic and stippled cells. The nonprotein nitrogen of the blood serum was 65 mg per 100 cc. Blood cultures showed *Bacillus mucosus capsulatus* (Friedlander's bacillus), as did the urine cultures.

Portable x-ray films of the chest showed a band of linear density extending upward and laterally from the left hilus to the lateral chest wall in the region of the interlobar pleura. There were oval areas of rarefaction just beneath the pleural surface in this area. The lung markings extending to the right base were a little prominent, and there was some haziness just above the midportion of the right diaphragm. There was a large calcified node in the right hilus. The diaphragm was high in position. The costophrenic angles were clear. The aorta was tortuous, and there was calcification in the arch.

The patient had another chill on the afternoon of admission. Sulfanilamide therapy was begun. On the following day his temperature was 103.8°F. There were many rales at the right base posteriorly. On the third hospital day the patient was drowsy and could not be aroused. The right lung was clear, but rales were heard at the left base. The abdomen was negative. There was slight stiffness of the neck. The white-cell count was 32,700 with 96 per cent polymorphonuclears. The temperature was 101 to 103°F. On the following day his neck was stiff and rigid. The left chest was clear, but rales were present on the right. The nonprotein nitrogen of the blood serum was 95 mg per 100 cc. On the fifth hospital day he still could not be roused. His pulse was very weak. There was slight edema of the ankles. The abdomen was slightly distended. There was slight jaundice. His neck remained stiff. He rapidly failed and died on the sixth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR CHARLES L. SHORT: May we see the x rays?

DR AUBREY O. HAVIPTON: These portable films were taken in this hospital. The linear shadows described in the left lung follow the course of the pleura between the upper and lower lobes. You sometimes see them following pleurisy, they are



were guaiac positive The sedimentation rate was 3 mm in fifteen minutes, 7 mm in thirty minutes, 12 mm in forty-five minutes and 15 mm in sixty minutes

X-ray films showed a soft-tissue mass about 4 cm in diameter in the left side of the true pelvis There was fecal material in the bowel, and the right kidney area showed multiple areas of density An intravenous pyelogram was negative The lumbar vertebrae showed lateral curvature, apparently due to anatomical variation of the fifth lumbar vertebra and upper segment of the sacrum There was no evidence of metastatic malignancy in the bone On the following day, x-ray films showed no change in the soft-tissue thickening in the pelvis There was more gas in the small bowel on the left side of the abdomen The loops were definitely dilated, and one extended to the true pelvis There also was gas in the colon Although the gas in the small bowel indicated some obstruction, it apparently was not complete

She did not improve, and on the fourth hospital day an operation was performed

#### DIFFERENTIAL DIAGNOSIS

DR. OLIVER COPE I should like to narrow down the diagnosis, if I can, before Dr Hampton shows us the x-ray films

A brief review of the history shows a first episode of acute gonorrhea Seven years later there was a period of abnormal bleeding, a diagnosis was made of carcinoma of the cervix but we are not told anything definite about it She had x-ray treatment, then radium, with complete relief of the abnormal bleeding and cessation of the menses In the first month after the irradiation there appeared these transient periods of weakness, occurring frequently, which may have been menopausal symptoms or may have been associated with what appears later Before she entered the hospital she had a more profound spell of weakness accompanied by pain, and subsequently we find that there must undoubtedly have been an intestinal hemorrhage and also some bowel obstruction X-ray study gives further evidence of a mass in the left side of the pelvis and of small-bowel obstruction, which is consistent with the history

The diagnosis has to take in two important things small-bowel obstruction and intestinal hemorrhage The physical findings are of importance At the time of the second admission, when the radium was given under an anesthetic, no mass was felt in the pelvis The mass shown by x-ray is, therefore, something that has arisen in the past seven months I shall exclude certain diagnoses very rapidly In the first place, inflammatory lesions such as appendicitis and diverticulitis should

be excluded on the basis of intestinal hemorrhage Endometriosis, which occasionally might cause intestinal hemorrhage and may also give small-bowel obstruction, I exclude on the basis of the artificial menopause which had been produced seven or eight months previously There ought to have been no recurrence of endometriosis, had it been present before the irradiation I also exclude simple intestinal obstruction in view of the intestinal hemorrhage In the same way I exclude pelvic inflammation with necrosis following irradiation, I have not seen intestinal hemorrhage under these circumstances That narrows the diagnosis down to two possibilities metastatic malignancy from the cervix to the bowel and Meckel's diverticulum or a primary malignant tumor in the small intestine When we consider metastatic malignancy, I think we can narrow the field still further I have never seen an ordinary carcinoma of the cervix give rise to intestinal hemorrhage and to small-bowel obstruction—that may be due to lack of experience, an adenoacanthoma, however, does I have seen one case in which an adenoacanthoma had a secondary lesion in the large intestine with both bleeding and obstruction I think, therefore, an adenoacanthoma is the most logical way of tying up carcinoma of the uterus and the present symptoms

If it were not for the history of a lesion in the uterus I should say that the history for which the patient entered the hospital would be best explained by a Meckel's diverticulum Such a diverticulum characteristically gives bouts of hemorrhage and when acutely inflamed leads to intestinal obstruction I shall leave it with these two diagnoses, adenoacanthoma and Meckel's diverticulum, until we hear what Dr Hampton has to say

DR. AUBREY O HAMPTON This patient had an x-ray of the spine and chest for metastases, and none were found This film was taken on the first day, when she had very little evidence of intestinal obstruction This was the shadow described on the left side, which was thought to be a round mass It is not so sharp and distinct as a tumor would be It could be a loop of dilated bowel just as well Usually the outline of a cyst or tumor is seen all the way around, but this shadow is only partially outlined That may be because it is tubular, it could not be circular This soft-tissue shadow is better seen in the film taken at the time of the intravenous pyelogram examination We can see the bladder and then a perfectly smooth mass that looks like the uterus sitting on top of it At this examination two days later we see the small bowel dilated down to the region of the true pelvis That is evidence enough of dis-

## ANATOMICAL DIAGNOSES

Septicemia, *Bacillus mucosus capsulatus*  
Multiple abscesses of the liver  
Healed pulmonary tuberculosis

## PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY Dr Short has done as well as we could at the autopsy. We could not find the source of infection. We did not have permission to do the head, so one of the accessory sinuses may possibly have provided it. We did do the spinal cord, however, and he had no diffuse meningitis. The most obvious findings at autopsy were multiple abscesses in the liver, the right lobe being almost completely filled with them. It is often difficult with extensive liver involvement to determine the mechanism of infection. Nothing was found, however, to suggest cholangitis or pylephlebitis, so that I believe the organisms reached the liver via the hepatic artery as part of the general septicemia. The lungs were entirely negative, except for extensive healed tuberculosis. The kidneys showed vascular nephritis and the ordinary cloudy swelling due, I am sure, to his fever and toxemia. There was no pyelonephritis, and though the prostate was a little large, it was not hard and did not appear to be obstructing, so I do not think the urinary tract was the source of infection.

## CASE 25252

## PRESENTATION OF CASE

*First Admission* A thirty-eight-year-old widow was admitted complaining of dysuria.

She had noticed burning at the end of micturition of seven days' duration. Frequency and urgency were also noted. Gram-negative intracellular diplococci were found. Diagnoses of cystitis and acute urethritis were made. She was discharged on the eighteenth hospital day.

*Second Admission* (seven years later) Her menses had been normal and regular until four months before admission when she had five attacks of intermenstrual bleeding during one month. Each was somewhat less in amount than that of a normal period. Following this she had daily spotting until three weeks before entry when a diagnosis of carcinoma of the cervix, confirmed by biopsy, was made at another hospital. She received 4500 r of x-ray therapy during the next twenty-one days. After the treatment was begun the discharge changed from bloody to serous. She had continued to have periods at the regular time, the last one twenty-six days before entry.

Physical examination showed a well-developed and nourished woman in no distress. Examination of the chest was negative except for an occasional rale at the right apex. The blood pressure was 120 systolic, 80 diastolic. An apparent x-ray burn was present on the skin of the lower abdomen. Under nitrous oxide anesthesia, pelvic examination showed a 9-cm retroverted uterus which could be replaced. There was apparent submucous extension of the cancer at the external os, but the lesion seemed fairly superficial, a biopsy was taken. Radium needles were implanted, the total dose being 3000 hours. The pathological report on the biopsy was acute and chronic inflammation.

On the fourth hospital day the patient vomited several times. The abdomen was soft. No further vomiting occurred, however. Her chart remained flat, and she was discharged on the tenth hospital day.

*Third Admission* (seven months later) For several months after discharge the patient had weak spells almost every day but gained a small amount of weight. She had no vaginal bleeding and no further menses. One week before admission she noted the onset of rapidly increasing weakness followed three days later by a severe mid-abdominal pain located for the most part about the umbilicus and radiating through to the back. At the same time, nausea, vomiting and constipation developed. Her abdomen then became distended. On the afternoon of the day of admission an enema was given, with expulsion of a large amount of black fecal material. Following this her pain was greatly relieved, but recurred and was relieved by 1 gr of codeine.

Physical examination showed a well-developed and nourished woman in no acute distress. The skin of the lower mid-abdomen showed increased pigmentation and induration over a 15-cm area. Examination of the chest was negative. The blood pressure was 118 systolic, 80 diastolic. The abdomen was soft, with active peristalsis. There was acute right lower-quadrant tenderness, but no spasm. There was also rebound tenderness referred to the midline.

The temperature was 98.6°F, the pulse 80, and the respirations 17.

The urine examination was negative. The blood showed a red-cell count of 4,410,000 with 80 per cent hemoglobin, and a white-cell count of 10,900 with 87 per cent polymorphonuclears. The smear showed several band forms of polymorphonuclears, a young polymorphonuclear and an atypical mononuclear. Some of the red cells appeared somewhat larger than normal. The serum protein was 5.5 gm per 100 cc. Two stool examinations

source for such cells, except within malignant tumors, is in tissue that has been heavily radiated. I consider that finding very characteristic of post-radiation effect, and I think there is no doubt that that was the cause of the localized lesion. Certainly the picture was quite unlike that of regional ileitis, the only other condition we must seriously consider.

DR. HAMPTON: In retrospect we believe that the loop of diseased small bowel was adherent to the fundus and hence lay in the same place throughout the treatment so that by crossfire treatment the maximum dose was delivered to it.

DR. MALLORY: Under ordinary circumstances is it fair to assume that during such a series of treatments several loops would be in your field from time to time rather than one?

DR. HAMPTON: Yes.

DR. COPE: What was the lesion for which she was given the radiation?

DR. MALLORY: Carcinoma. There was never any doubt about that. So far as can be made out at the present time it has been cured.

A PHYSICIAN: Do you think the episode of vomiting represented an acute reaction in the loop of bowel?

DR. MALLORY: I do not know, it may have been that or x-ray sickness.

DR. HAMPTON: She took radiation well and worked throughout the course of treatment, there was no roentgen sickness.

A PHYSICIAN: It says she vomited all day. Presumably after the radium needles were inserted?

DR. HAMPTON: Well, perhaps so.

case in or around the small bowel. We have fair or definite evidence that the small bowel is partially obstructed and that it was an intermittent obstruction.

**DR COPE** It looks as if we were dealing with a true tumor, and the apparent tumor is obstructed bowel. It is very difficult to say on the evidence what the type of cancer may have been, if indeed malignancy was present. The record hedges on this point, saying that the diagnosis of cancer was made at another hospital. It is perfectly possible that the bleeding may have been due to ovarian dysfunction with abnormal endometrium and not to cancer of the cervix or endometrium. An ovarian dysfunction, however, would not explain the intestinal obstruction unless it were one of those things that we hear about—radiation reaction in the presence of an old pelvic inflammation, with secondary obstruction. That does not account for the intestinal hemorrhage. The hemorrhage suggests either that a cancer is present or that it comes from an ulcer in a Meckel's diverticulum. In the absence of definite evidence, the most likely diagnosis is cancer in or around the uterus, with secondary involvement of the small bowel, obstruction and hemorrhage. Adenocarcinoma is the one thing in my experience that would fit the picture and that is my first diagnosis. My second diagnosis is Meckel's diverticulum. I believe it is possible that the original hemorrhages were on the basis of an ovarian dysfunction due to chronic pelvic inflammation, that the diagnosis of cancer was an error and that the heavy irradiation led to intestinal obstruction.

**DR TRACY B MALLORY** It is obviously a difficult diagnostic problem. Has anyone else any suggestions to offer?

**DR HORATIO ROGERS** I should think that x-ray necrosis of the intestine would have to be considered more seriously.

**DR COPE** Did you ever see hemorrhage following it?

**DR HAMPTON** And does not the hemorrhage usually occur at the time of maximum x-ray reaction?

**DR ROGERS** Dr Frank Pemberton has had some cases at the Free Hospital in which the hemorrhage came on quite late, several months after treatment.

**DR HAMPTON** I treated this woman and I gave her most of the treatment in front, crossfiring the midline. She took it very easily without nausea, and I could give her 300 r daily. She was given about 3500 r in front and the other 1000 r behind, with no very obvious reaction. We have given that same dose routinely without any such thing

as this occurring and without risk of radiation necrosis.

## CLINICAL DIAGNOSIS

Intestinal obstruction

**DR COPE'S DIAGNOSIS**

Adenocarcinoma of uterus and small intestine

## ANATOMICAL DIAGNOSIS

Post-radiation enteritis

## PATHOLOGICAL DISCUSSION

**DR MALLORY** I shall read you part of Dr Langdon Parsons's operative notes since he is not here to tell us about the findings.

On entering the peritoneal cavity, there was an escape of a quantity of thin, peritoneal fluid—obviously in response to an inflammatory condition within the abdomen. This was soon identified as being present in the distal portion of the ileum about 45 cm. from the ileocecal valve and represented a large, pie shaped area involving the root of the mesentery which was acutely edematous and thickened, about 2.5 cm. in depth. The bowel itself was involved for a distance of about 45 cm. and was loosely adherent to the top of the fundus, this could be easily stripped off with the examining finger without denuding the bowel. It had obviously not been involved in the radiation from below. While the uterus was fixed, there seemed to be no evidence of pre-existing carcinoma of the cervix and the fixation was probably due to fibrosis. The bowel in the involved area showed spots suggestive of gangrene. The entire area was devascularized, the walls were markedly thickened and contracted. The lumen was from 2 to 3 cm. in diameter. There was no marked evidence of dilatation above the point of obstruction. The entire appearance was that of an area exposed to heavy radiation. There was no suggestion of perforation of the bowel. This large loop was freed with great difficulty, the difficulty came in that the bowel was so stiff and edematous that it did not appear in the wound as normal small bowel would, even after freeing it from the uterus, but tended to bend, much as a lead pipe would. The balance of the mesentery appeared normal.

It was very obvious when the specimen reached the laboratory that the bowel wall was of unusual stiffness, and I can well believe that the operator faced a great many difficulties in manipulating it. On opening it we found hemorrhagic necrosis of the mucosa, with extension down through all layers of the bowel wall. Microscopically the most striking feature, perhaps, was the presence in many parts of the specimen, but particularly I should say in the mesentery, of fibroblasts of most unusual character—four or five times the normal size with giant nuclei and giant nucleoli and very frequently five or six nuclei in a single fibroblast, the type of cell one ordinarily considers evidence of a high grade of malignancy. The one common

it is no easy matter to persuade a patient to undergo a second operation even if it be a minor one and for his own good

If a biopsy is done, let it be performed thoughtfully, skillfully and circumspectly, with full recognition of the impossibility of any accurate diagnosis from inadequate or poorly prepared material. Lack of attention to these details may — and often does — lead to disappointment, false statistical data and even danger.

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### THE TUBERCULOSIS PHENOMENON

In this issue of the *Journal* is a discussion of the current programs for tuberculosis control. Many who have cultivated the habit of passing by these perennial presentations would do well to pause and read one now and then.

In the early days of the "war on tuberculosis" a great emotional stimulus was needed. Zealots were good promoters then, for they fostered the combative spirit and thus produced the action and reaction necessary to publicize and popularize the cause. At first they were mere voices, clamorous in the wilderness of a still medieval point of view toward sickness and its prevention. Gradually they began to achieve, they attracted more attention, more sympathy, more support, more acceptance of their efforts as one of the great moral movements of the day. About them there appeared the little parasitic enterprises and fads that always attach themselves to a successful venture, just as barnacles attach themselves to a mighty rock. The movement became stabilized and at length an accepted part of what is now recognized as a public-health responsibility.

No longer should we think of the "cause" or a "war." Such an emotional background is neither needed nor wanted by those who might equally resent being referred to as an "army" of workers. It is an established group of specialists, already divided into their own subspecialties, paid largely from public funds and rendering their services

largely in public institutions. They no longer need the zealots of the past. They go about their work in a deliberate, business-like manner. It makes little difference to them what kind of seals you buy at Christmas and whether you open your bedroom windows at night.

With a mortality reduction of approximately 70 per cent in the past forty years, what used to be called the tuberculosis problem not only seems well under control, but is itself already creating new problems. The momentum of eradication is greater than statisticians dared to predict a few years ago. It can easily be maintained if living standards can be maintained and early cases recognized. Within a few years the need for new beds for tuberculosis will disappear. Within a few generations the herd immunity of those who have encountered and resisted the disease will disappear. It is no longer a problem in the ordinary sense — it is a phenomenon.

### OBITUARY

RICHARD CLARKE CABOT

1868-1939

In every generation there are restless souls, who cannot be made to fit the common mold. A few of these are valuable in keeping their communities and professions in a ferment by their constant challenge to the existing order of man's thought and action. But when, in addition to possessing these attributes, a rare individual is endowed with the divine fire and makes important contributions to the pioneering progress of humanity, then indeed we recognize a great leader. In the thick of the fray such recognition comes slowly but as the smoke of the battle clears the acclaim is universal.

Richard Clarke Cabot was born in Brookline, Massachusetts, May 21, 1868, and came within two weeks of living seventy-one years. He was the fifth son of James Elliot and Elizabeth (Dwight) Cabot. After preparing for college at Noble and Greenough School, he entered Harvard University from which he received his A.B. degree, *summa cum laude*, in 1889 and his M.D. in 1892. Three other degrees he received later in life in recognition of his attainments, an LL.D. (Rochester, New York, 1930), an L.H.D. (Syracuse, 1934) and a D.D. (Colby, 1938).

In 1894 he married Ella Lyman in Waltham

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## THE DEFINITIVE BIOPSY

A RECENT number of the *Cancer Bulletin*,<sup>1</sup> has commented on Ewing's<sup>2</sup> ideas concerning the use and abuse of the diagnostic biopsy. He comments at some length on the "regional indications" and states, in regard to tumors of the breast: "When a woman presents a lump or induration in the breast, one assumes a serious responsibility if he delays in making a positive diagnosis. The most direct method is to remove the mass and determine its nature at once."

It is generally agreed that in the presence of a tumor a biopsy is indicated if only as "a confession of the inaccuracy of clinical judgment," but it must be admitted that there are certain dangers associated with the surgical removal of such specimens. These dangers have been fully pointed out by Ewing, and need not be enlarged on here. In

general, however, it may be stated that a positive and reasonably accurate diagnosis of any tumor must, of necessity, form the basis of effective and intelligent treatment and that a biopsy affords the simplest and surest method of attaining this end.

To the points which Ewing has made, we should add two more, applicable in particular to the less frequently employed but nonetheless important biopsies of bone tumors and lymph nodes.

For the proper diagnosis of the removed tissue, it is essential that the material be adequate in amount, satisfactorily fixed and properly stained. Nowhere is this more true than in the field of lymph-node diseases and bone tumors, yet again and again the biopsied tissue, often inadequate in amount, is allowed to dry and shrivel before fixation or is summarily dropped into an inadequate fixative in pieces too thick to allow of proper preservation. The resulting sections, often poorly cut and stained, cannot be properly diagnosed, and the pathologist is frequently forced to state "Probably malignant tumor, exact nature uncertain." Surgeons expecting to do such biopsies can easily obtain directions from competent pathologists for the proper preservation of tissue, and he who expects to send a case to some large medical center for consultation or for treatment if the mass should prove to be malignant would often be far better served if biopsy were deferred until the patient is seen at such a medical center. Neither the patient nor the referring doctor nor the consultant loses by such a procedure.

In the field of lymph nodes, one further error is not infrequently committed. There is a tendency to pass by the large nodes and remove one which is small and perhaps more readily accessible. Not infrequently such a node is found to be merely the site of an inflammatory or hyperplastic process in no way indicative of the major underlying disease. The pathologist may be compelled to report "No evidence of tumor formation", nor can he justifiably modify this statement on the basis of the clinical findings. The histological evidence before him is clearly indefinite, through no fault of his own. He can, at best, suggest another biopsy, but

workers still pioneering in social service within and without the walls of the old hospital. All parts of the world have followed the example set by this group, just as they have studied Cabot's *Physical Diagnosis* and *Clinicopathological Conferences* and recognized his epoch-making medical contribution of 1914.

During the second decade of the century Dr Cabot continued his intensive work in medicine and social service, adapting it from 1917 to 1919 to suit the changed conditions of the days of the World War, when he served as chief (major to lieutenant colonel, Medical Corps) of the medical staff of Base Hospital No. 6 (Massachusetts General Hospital Unit) in the A. E. F. in France, and under the Red Cross established dispensaries for refugees and lectured in French on social work at the Collège de France. In 1912 he was appointed as one of the two chiefs of the medical staff at the Massachusetts General Hospital, which position he held till his retirement in 1921, and in 1919 he was appointed professor of clinical medicine and professor of social ethics at Harvard, not a whole settee as in ancient days but twice as many chairs as has been possible for the average mortal to occupy in our own generation.

It was in 1914, however, just at the beginning of the World War, that Dr Cabot made his most important medical contribution in a short but vital paper published in the *Journal of the American Medical Association*, a landmark in medical history, which places him as the greatest contributor to cardiology in our generation. The war undoubtedly obscured this advance,—as it did that other very important American contribution to cardiology by Dr James Herrick, of Chicago, on coronary thrombosis in 1912,—but now, after twenty-five years we can appreciate its full significance, and Dr Cabot's name becomes associated with that of Sir James Mackenzie as a prime leader in the field of heart disease in the past half century. Yet he made this significant contribution merely in passing, as it were. Although heart disease was one of his pet hobbies in medicine,—witness his volume *Facts on the Heart* (1926),—it was a lesser interest after all, and he never pretended to be a heart specialist.

To some who are not cognizant of the great advances in cardiology since the World War this contribution of Dr Cabot's in 1914 may still be news, but to those of us who have concentrated in the field it is the foundation of much if not most of our work in the last two decades. The paper was entitled "The Four Common Types of Heart Disease." For the first time, proper emphasis was laid on the etiologic diagnosis of heart disease, in contrast to the overemphasis of struc-

tural defects that had been current for over two hundred years. The revolution in point of view has been amazing. Where at one time, in fact for generations, textbooks and papers had been preponderantly involved with such subjects as mitral regurgitation, myocarditis and pericarditis, they now present as a primary interest the causes of heart disease. Not only has such a viewpoint become of major importance in routine diagnosis, prognosis and treatment, but it has also stimulated the essential studies of the etiologic factors behind heart disease with much promise in the fundamental field of preventive medicine. Sir James Mackenzie's great service to cardiology was in setting forth clearly the need of paying attention to disorders of function of the heart, Dr Cabot's contribution on etiology was even more significant.

It was during this same decade, 1910 to 1920, that Dr Cabot pioneered in still another medical field and thereby aroused the ire of many physicians and medical societies. In his militant bluntness and precipitate desire to correct the errors of the practice of medicine he wrote to the laity on the subject of *Better Doctoring for Less Money*, many years before it became fashionable to belabor the family doctor or specialist. Many persons with less of the zeal of the impetuous reformer believe that there are gentler and perhaps wiser ways to correct the errors of today than by substituting the errors of tomorrow, but undoubtedly these stormy methods have a certain value in hastening the return to a sensible equilibrium after all the shouting and the tumult have subsided.

Another extracurricular activity of Dr Cabot's took place for a few months prior to the entrance of the United States into the World War. Believing strongly in the need of our taking the side of England and France on the battlefield itself, he and his wife went West on a vigorous speaking tour to rouse the country and did not stop until war was declared. He could not sit still when something in which he had his heart needed to be done.

In completing this brief glimpse of Dr Cabot's rich life, let us view the post-war years, the last two decades. After the stirring days of the quarter century following the beginning of his professional career this latter period became relatively peaceful, actually richer and riper. To some who did not sense this change it seemed almost as if he had retired. On the other hand he went on to higher levels, leaving to us others the study and the care of the body. With the years he came to realize with increasing force the need of the study and the care of the spiritual side of man, his character and personality, truly, his soul.

and spent the next half year traveling and studying in Europe before settling down to practice and to begin his teaching and researches at 190 Marlborough Street in Boston. His married life was an extraordinarily happy one and continued fortunately for forty years. The devotion of Dr Cabot and his wife to each other was a constant joy to their friends and a source of inspiration for much of his philosophical writing.

It is not possible to divide Dr Cabot's life into clear-cut periods of activity, for one interest merged into another gradually and naturally. In fact what some consider a late interest, namely philosophy, came early in life as shown by the facts that he was a lecturer in that subject at Josiah Royce's Harvard Seminary course in logic in 1903-1904 when but thirty-five years old and that in 1905 at thirty-seven he inaugurated social service at the Massachusetts General Hospital. It is true, however, that the earlier half of his professional life was preponderantly concerned with medicine and the later half with social ethics.

Twenty-five years ago when I presented a letter of introduction from him to a medical leader abroad he expressed surprise that Dr Cabot could still be alive after such a record as he had already made. And yet he was then only forty-five years old.

The reason for Dr Cabot's early fame in medicine was his great ability and industry in pioneer work. He was indefatigable to the end of his days and always a pioneer. At the age of twenty-eight, in 1896, he published his first book *Clinical Examination of the Blood*, which went into five editions in eight years. In 1899, at thirty-one, he published *Serum Diagnosis of Disease*. His service in the Spanish-American War on the hospital ship *Bay State* as lieutenant in the Medical Corps was a great stimulant to his increasing interest in the blood and in infectious diseases. But soon he left these fields, although he could easily have continued in them as a leading authority had he so chosen. He feared a narrowing of his viewpoint. In the ten years from 1901 to 1911 he wrote three medical books of wide interest, the first of which, *Physical Diagnosis*, has been used the world over as a textbook and has appeared in twelve editions from 1901 to 1938 (the last edition with Dr F. Dennette Adams). The other two medical books published in that decade were *Case Histories in Medicine* (1906) and the first volume of *Differential Diagnosis* (1911), the latter went into four editions from 1911 to 1919 and was followed by the second volume, of which there were three editions from 1915 to 1924.

More important, however, than any of his books in that decade was his introduction of autopsy

teaching in 1910, the first of the long and continuous series of his famous *Clinicopathological Conferences* that are still carried on actively at the Massachusetts General Hospital in a modified way. Dr Cabot was an incomparable teacher, a master at this kind of exercise, always willing to commit himself to stimulate his students and his colleagues to learn through their errors as he did through his own.

During this period of intensive medical work 1901 to 1911, Dr Cabot also carried on a practice and served at the Harvard Medical School (appointed instructor in medicine in 1903 and assistant professor in 1908) as well as at the Massachusetts General Hospital (physician to the Out Patient Department in 1898 and assistant in medicine in 1899). From 1902 to 1929 he conducted very popular summer courses in internal medicine at the hospital. These were attended by physicians from all parts of the country and constituted pioneering work in the important but neglected field of postgraduate medical education in the United States.

It was still in that decade of his greatest medical activity that Dr Cabot made his second vital contribution, in another though related field. In 1905 he started medical social service at the Massachusetts General Hospital and in 1909 wrote a book *Social Service and the Art of Healing* of which there was a second edition in 1928.

In 1930, when a special Social Service Fund was raised for educational purposes in commemoration of the twenty-fifth anniversary of the beginning of hospital social service, Dr Mary Lawson wrote

I am so glad that you asked me to give my bit to continue the wonderful work that Dr Cabot started. I remember its beginning very well. I was with him at the time. Did you know that he had something of the kind in mind ever since he was a small boy of ten? I do not believe there is anyone more thoroughly acquainted than I am with the wonderful unselfishness of Dr Cabot's character. He is always doing something for others. When he started the work he had to meet so much unbelief in its usefulness, but he has that wonderful gift of seeing beyond and he knew what its future would be. It started in a little corner of a corridor in the Out Patient Department surrounded by screens, with one paid worker and volunteers. Dr Cabot consulted with and advised the helpers daily, being himself responsible for all financial aid beyond what little might be given by subscription. The work was Dr Cabot in those days.

This tradition of service Dr Cabot maintained to the end of his years, passing on in the course of time most of the responsibilities and a host of important developments in this social service field to the able leader who has taken his place, with her own mantle as well as his, Ida M. Cannon. Miss Cannon has surrounded herself with other



the uterus passes through the cervix and may even appear outside the vulva. The condition occurs chiefly in the presence of atony. First there is a dimpling or cupping of the fundus of the uterus, which may be due to the weight of a high implanted placenta, to a forcible attempt to deliver a relaxed uterus or to traction on the cord. The fundus projecting into the uterine cavity acts as a foreign body and stimulates forcible contractions of the rest of the musculature in an attempt to expel it—hence the complete inversion.

Inversion of the uterus is generally accompanied by profound shock and profuse hemorrhage. The diagnosis should be easy. The fundus can no longer be felt above the symphysis. There is a large, rounded, spongy mass protruding from the cervix, associated with profuse bleeding and signs of collapse.

Successful treatment depends primarily on improving the condition of the patient before any measures to replace the uterus are undertaken. The profuse bleeding may generally be controlled temporarily by firm packing of the vagina, intravenous fluids and transfusions should be given. Then, and not until then, it is proper to attempt a gentle manual reposition of the uterus. At times this can be successfully accomplished under ether anesthesia, often, however, it will be found that the cervix has shut down so tightly that it is impossible to push the large boggy fundus through it.

Should this be the case, immediate operation of the type suggested by Huntington\* is the method of choice. The patient is placed in Trendelenburg position, anesthetized and prepared. The abdomen is opened in the lower midline. A funnel-shaped depression at the site of the cervix is then evident from within the pelvis, with the tubes and round ligaments leading into the opening. The operator and his assistant, each armed with Allis forceps, then grasp the invaginated portion of the uterine wall about 2.5 cm below the cervix and draw it gently upward. New bites are taken just below the original ones, and thus the fundus of the uterus is gradually returned to the abdominal cavity, that part which went through the cervix last being the first to be withdrawn.

If the uterus is not replaced, the patient may recover from the shock and hemorrhage and live to face the dangers of sepsis. Rarely there may be a spontaneous return of the uterus to the abdomen, but cases have been reported in which the cervix has shut down so completely that gangrene and sloughing of the fundus have occurred.

When untreated, the condition occasionally

passes on to the chronic stage, with marked involution or atrophy of the fundus. In chronic cases in which the inversion has been present for more than a month it is usually impossible to replace the uterus without splitting the cervix by some form of vaginal operation.

This condition is of interest in Massachusetts because in 1937 there were two deaths from inverted uterus, and in 1938, one. Subsequent case reports in the *Journal* will deal with acute and chronic inversion of the uterus.

## LEGISLATIVE NOTES

The approved enabling act for medical insurance was presented to the Committee on Rules of the Massachusetts Legislature on June 8. No report had been made on it up to June 21. The proposed act reads as follows:

### AN ACT ALLOWING THE INCORPORATION OF NON PROFIT MEDICAL SERVICE CORPORATIONS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

*Section 1* Any corporation organized under the laws of the Commonwealth for the purpose of establishing, maintaining and operating a non profit medical service plan whereby the cost of certain medical care and service may be paid for in whole or in part by such corporation, to such of the public as become subscribers to said plan under a contract which entitles each subscriber to specified payments for the cost of certain medical care or service, shall be governed by this chapter and shall be exempt from all provisions of the insurance laws of the Commonwealth, except as otherwise provided in this chapter. Wherever the term *medical care and service* is used in this chapter it shall be deemed to include surgical care and service and the term *physician* shall also be deemed to include *surgeon*. The term *medical care and service* as used in this section shall be construed to be medical care and service as defined by the statutes of Massachusetts and the opinions of the Massachusetts Supreme Court.

*Section 2* Persons desiring to form such a non profit medical service corporation shall incorporate as provided in section three of chapter one hundred and eighty. At least a majority of the directors of such corporation shall be at all times persons licensed to practice medicine in the Commonwealth. Every certificate of organization of a corporation subject to this chapter filed under said chapter one hundred and eighty shall have endorsed thereon or attached thereto the consent of the Commissioner of Insurance and of the Commissioner of Public Welfare.

*Section 3* Any corporation subject to this chapter may enter into contracts with persons, to be known as subscribers, calling for the payment by such corporation, subject to such limitation and at such rates as shall be specified in such contracts, of the cost of medical care furnished to such subscriber, or to his or her dependents or family, by a physician or physicians licensed to practice medicine. All such contracts with subscribers shall be in writing and the terms and provisions thereof shall at all times be subject to the approval of the Commissioner of Insurance. The rates or bases at or upon which physicians are to be compensated for medical care or service rendered to or for the benefit of a subscriber shall

Huntington J L. Acute inversion of the uterus. *Boston M & S J* 184,37-6:350 19 1

Through the years by a process of natural evolution he came to be less interested in man's body or even in man's mind than he was in his soul. Even in the hard war years I can recall in many quiet conversations with him how impatient he was with the mere healing of wounds and illnesses, and the education to be found in most schools and universities. Morons can be superbly healthy, criminals can be highly educated. It was the spiritual quality of any individual that attracted his attention, and the possibility of its cultivation that became to him a challenge. Probably to most mortals this realization comes with force enough to demand attention only in advanced age when it is too late to act, but Dr. Cabot was still strong and full of years when he set to work to tackle these problems. This richest part of his life, too recent for us, is least known and appreciated. One of the studies inaugurated during the last few years—the Cambridge-Somerville Youth Study—will take ten more years to run.

Scant witness of Dr. Cabot's growing interest in human society and in man's soul is to be found in a number of books published in the last twenty-five years of his life: *What Men Live By* (1914), *Adventures on the Borderland of Ethics* (1926), *The Goal of Social Work* (1927), *The Meaning of Right and Wrong* (1933, 1936), *The Art of Ministering to the Sick* (with Reverend R. L. Dicks, 1936), *Christianity and Sex* (1937), and *Honesty* (1938). When he died he was at work, with a literary friend, on what he believed to be his most important philosophical treatise, a summing up of values in life.

I cannot forbear mention of Dr. Cabot's final illness, which lasted nearly a year after more than twenty years of bother with both peptic ulcers and angina pectoris (despite which he played tennis until nearly seventy). Uncomplaining and brave, he followed the course of his own heart failure with great interest, challenging our diagnoses if he thought we were off the track and helpfully too, and hastening to concede the value of various medicines as we gave them, completely wiping out any reputation he may have had earlier in life as a therapeutic nihilist. He always demanded to know the truth of what we thought about his condition and did not flinch from pain or from the realization of his grave prognosis. He persuaded us to allow him for his mind's sake to work on his books and to teach, even when he was an invalid. What he did in this way seemed to help him physically also, as he predicted. For months his classes came to his bedroom twice a week and cherished this privilege as they will the memory of it.

His death ends a life of great service to man.

Had he accomplished what he did in any one of his three chosen fields—medicine, social service, ethics—it would have been more than enough.

Through his last will and testament his spirit will continue to be active for many years to come. With rare wisdom he has bequeathed in his wife's name a fund to be used by trustees whom he selected to foster the work of any individuals not otherwise adequately supported who give promise of making important contributions to humanity in any field of activity: art, music, literature, philosophy, theology, education or science. Causes and institutions merely as such he did not wish to help, but as they are related to individuals of promise they may be incidentally benefited.

To others I must leave an account of his interests and talents in music, dramatics, literature and religion—his sense of perfect pitch, his Christmas carol choruses on Beacon Hill, at the Massachusetts General Hospital and in France, his skill with the violin, his readings of poetry and prose to groups of friends, his acting in theatricals, his sermons and his Sunday School lessons. To one person above others, Alice O'Gorman, Dr. Cabot's secretary, I add a special word of tribute, without her constant and skillful aid, her quiet encouragement and her understanding care he could not have accomplished what he did.

To me, as to many others, Richard Cabot was always a stimulating counsellor, vigorous critic and warm-hearted friend. In his example he has left a great heritage.

P D W

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## MASSACHUSETTS MEDICAL SOCIETY

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### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

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#### INVERSION OF THE UTERUS

Inversion of the uterus is a rare complication of labor. The incidence varies in accordance with the author from 1 in 20,000 to 1 in 190,000 deliveries. It generally accompanies or follows the birth of the placenta and is more frequent in primiparas. The mortality as quoted in the literature is high, but with immediate recognition and proper treatment it should be low. It may be spontaneous or induced, it may be partial or complete. In the complete cases the fundus of

\*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

**GIBSON**—**DAVID H GIBSON**, M.D., of 115 Mt. Auburn Street, Cambridge, died June 8. He was in his fifty fifth year.

After attending Cambridge Latin School he received his degree from Tufts College Medical School in 1921. Dr. Gibson was a member of the Massachusetts Medical Society and the American Medical Association.

His brother survives him.

**REYNOLDS**—**GEORGE P REYNOLDS**, M.D., of Brookline, died June 6. He was in his forty second year. He graduated from Milton Academy in 1915 and spent the following year at Phillips Andover Academy. He received his degree from Harvard College in 1920 and from the Harvard Medical School in 1924, and interned at the Massachusetts General Hospital. After serving as assistant medical resident at Johns Hopkins Hospital he became assistant in medicine on the staff of the Massachusetts General Hospital and was appointed junior visiting physician on the staff of the Boston City Hospital in 1928. Dr. Reynolds was assistant in medicine at the Harvard Medical School from 1928 to 1935 when he was appointed instructor in medicine, which position he held at the time of his death. He was particularly interested in medical social service work and in the application of practical psychological principles to the care of patients, and had contributed several articles on both topics.

In September, 1934, he was made physician to Milton Academy. Dr. Reynolds joined the Massachusetts Medical Society in 1927, serving as secretary to the Suffolk District Medical Society from 1933 to 1935. He was a member of the Council of the Massachusetts Medical Society from 1933 to 1937, being on the Committee of Arrangements from 1929 to 1934 and chairman of that committee in 1933. Dr. Reynolds was a fellow of the American Medical Association.

His widow, three daughters, his mother and a brother survive him.

## NEW HAMPSHIRE MEDICAL SOCIETY

**HARRIMAN**—**ALPHA H HARRIMAN**, M.D., of Laconia, died on May 30, after a long illness.

He was born in Albany, New Hampshire, on October 14, 1857, the son of Nathaniel and Rhoda A. Harriman. He was graduated from Bowdoin Medical College in 1883 and moved shortly to Sandwich, where he remained for three years before going to Laconia in 1887.

Dr. Harriman held memberships in the New Hampshire and Winnepesaukee medical societies.

Survivors are his widow, Mrs. Alice S. Harriman, a son, N. Joy Harriman, a daughter, Mrs. Murray W. Wright of Nashua, and four grandchildren.

**MACLEAY**—**ALFRED A. MACLEAY**, M.D., aged sixty nine, died Thursday, June 1, at the Notre Dame Hospital in Manchester after a long illness. Dr. Macleay, a native of Canada, came to Manchester from London, England, in 1899 and practiced as an eye, ear, nose and throat specialist until he retired because of ill health in 1932.

He was born in Castlebar, Quebec, October 8, 1869, the son of Alexander Monroe and Rosanna (Riddle) Macleay. He prepared for college at St. Francis School, Richmond, Quebec, and attended McGill University and Medical School, receiving the degrees of bachelor of arts, doctor of medicine and master of surgery.

Dr. Macleay was a life member of the British Ophthalmic Hospital in London, an honor granted him in recognition of his services there. He also was a member

of the Canadian College of Medicine, the American Medical Association, the American Surgical Association, the New Hampshire Surgeons Club and the state, county and local medical associations.

Besides his widow, the deceased is survived by a daughter, Mrs. Margaret Macleay Leavitt, a brother, Roderick Macleay, of High River, Alberta, and a sister, Mrs. John A. Wadleigh, of Danville, Quebec.

**TIBBETTS**—**GUY D. TIBBETTS**, M.D., aged fifty-one, died at Antrim, New Hampshire, on June 2.

He was born in Gloucester, Massachusetts, and was graduated from Tufts College Medical School in 1911. Dr. Tibbetts was one of 1000 American doctors loaned the British Government during the World War and for his services was awarded the Distinguished Service Cross.

He was a member of the Reserve Officers Corps, with the title of major, the Honorary Medical Society of Tufts College, the American Medical Association, the Hillsboro County Medical Association and the New Hampshire Medical Society.

## MISCELLANY

### HONORARY DEGREES AT BOSTON UNIVERSITY

Two doctors of medicine whose careers have been remarkable not only for services rendered but in length of time were presented honorary degrees in recognition of their achievements at the Boston University sixty sixth annual commencement exercises held on June 12.

Drs. J. Emmons Briggs, of Boston, and William Otis Faxon, of Stoughton, were awarded the honorary degrees of Doctor of Science. Both are graduates of Boston University School of Medicine, and Dr. Faxon is the oldest living graduate of the medical school in active practice.

Dean Jesse B. Davis, of the School of Education, presented Dr. Briggs for the degree, and the latter was cited by Dr. Daniel L. Marsh as "son of Boston University, whose superb abilities have been consecrated to the assuaging of human suffering and the advancement of medical science." Dr. Marsh's citation for Dr. Faxon, who was presented by Dean Alexander S. Begg, of the School of Medicine, was "oldest living graduate of Boston University School of Medicine in active practice, for sixty three years a glorious illustration of the finest connotation of the doctor in the home."

### PNEUMONIA AND ALLERGY EXHIBITS AT THE NEW YORK WORLD'S FAIR

In the Medicine and Public Health Building, New York World's Fair, Lederle Laboratories are sponsoring the scientific exhibits on pneumonia and on allergy, each exhibit being controlled by a committee of eminent specialists on these diseases.

The pneumonia exhibit, surfaced entirely of white laminated Beetle, occupies a booth 20 by 30 feet in a commanding position. It presents, pictorially, the best composite opinion of the medical profession on how a pneumonia case should be treated. The narrative is unfolded by means of a sequence of dioramas, pictures and charts. The story begins with an animation of a man walking in the rain, and takes him through typing and serum therapy and all the various progressive stages of a typical case of pneumonia to a final picture at the serum farm where his little daughter is pictured, saying "Thanks,

whenever the compensation of such physician is to be paid by such corporation, be approved by———

**Section 4** Every such corporation shall annually, on or before the first day of March, file in the office of the Commissioner of Insurance a statement, verified by at least two of the principal officers of said corporation, showing its condition as of the thirty-first day of December next preceding. Said statement shall be in such form and shall contain such other matters as the Commissioner of Insurance shall prescribe. A corporation neglecting to make and file its annual statement in the form and within the time specified shall forfeit one hundred dollars for each day during which such neglect continues, and, upon notice by the commissioner to that effect, its authority to do new business shall cease while such default continues.

**Section 5** The Commissioner of Insurance, any deputy or examiner, or any other person whom said commissioner shall designate, at least once in three years and whenever he deems it to be prudent, shall visit any such corporation and examine into its affairs, shall have free access to all the books, papers and documents of the corporation that relate to its business, and may summon as witnesses and examine under oath its officers, agents or employees, or other persons in relation to its affairs, transactions and condition. The commissioner shall require every such corporation to keep its books, records, accounts and vouchers in such manner that he or his authorized representatives may readily verify its annual statements and ascertain whether the corporation has complied with the law.

**Section 6** All acquisition costs in connection with the solicitation of subscribers to such medical service plans shall at all times be subject to the approval of the Commissioner of Insurance.

**Section 7** The funds of any corporation subject to this chapter shall be invested only in securities permitted by the laws of the Commonwealth for the investment of the capital of life insurance companies. The directors or other officers of such a corporation making or authorizing an investment or loan not included in the securities permitted for investment shall be personally liable to the corporation for any loss caused thereby.

**Section 8** If the Commissioner of Insurance is satisfied that any corporation subject to this chapter has failed to comply with the provisions of its charter, or is being operated for profit, or is fraudulently conducted, or if said commissioner is satisfied that its condition is such as to render its further transaction of business hazardous to the public or to its subscribers, or if, in the opinion of such commissioner, (a) the officers and agents of such corporation have refused to submit to an examination under section five, or (b) such corporation has exceeded its powers or violated any provision of law, or (c) it has attempted to compromise with its creditors (other than physicians) on the ground that it is financially unable to pay its claims in full or is attempting so to do, or (d) it is insolvent, then, in any such case, he may apply to the Supreme Judicial Court for an injunction restraining it from further proceeding with its business in whole or in part. The court may forthwith issue a temporary injunction restraining the corporation from further transacting any business, and it may, after a full hearing, make the injunction permanent, and appoint one or more receivers to take possession of the books, papers, moneys and other assets of the corporation, and settle its affairs, and distribute its funds to those entitled thereto, subject to such rules and orders as the court may prescribe.

**Section 9** Every corporation subject to this chapter is hereby declared to be a charitable and benevolent corporation, and its property shall be exempt from state, county, district and municipal taxes.

**Section 10** No corporation subject to this chapter shall pay any salary, compensation or emolument to any officer, trustee or director thereof, as such, nor shall it pay any salary, compensation or emolument amounting in any year to more than \$5,000 to any person, unless such payment be first authorized by a vote of its board of directors, provided, however, that such limitation shall not be applicable to the compensation paid to a physician for medical care and service rendered to subscribers. No corporation subject to this chapter shall make any agreement with any of its officers, trustees or employees where by it agrees that for any services rendered or to be rendered to the corporation he shall receive any salary, compensation or emolument that will extend beyond a period of three years from the date of such agreement.

CHARLES C LUND, M.D., *Chairman,*  
Committee on State and  
National Legislation.

## DEATHS

ALLISON—CARL E ALLISON, M.D., of Wakefield, died June 9. He was in his fifty second year.

Dr Allison received his degree from the Tufts College Medical School in 1914. He was a member of the Massachusetts Medical Society and the American Medical Association, and had practiced for twenty years in Wakefield.

His widow and a son survive him.

BERG—TERLA A J BERG, M.D., of 109 Broad Street, Lynn, died June 8. She was in her seventy first year.

Born in Ostersund, Sweden, she came to the United States when she was twenty five years old and received her degree from the Tufts College Medical School in 1898. A member of the Massachusetts Medical Society and the American Medical Association, she was one of Lynn's oldest women physicians, having practiced there for forty-one years.

A brother, Dr Ernest J Berg, professor of electrical engineering at Union College, Schenectady, New York, survives her.

DONOGHUE—JOHN J DONOGHUE, M.D., of Worcester, died March 21. He was in his sixty fifth year.

Dr Donoghue received his degree from the University of Michigan Department of Medicine and Surgery, in 1904. He was a former member of the Massachusetts Medical Society.

GAYLORD—JAMES F GAYLORD, M.D., of Springfield, died June 8. He was in his fifty first year.

Born in South Hadley, he received his early education there. He attended Dartmouth College and received his degree from the Dartmouth Medical School in 1914. He was a fellow of the Massachusetts Medical Society and the American Medical Association and was also a member of the Springfield Medical Association of which he was a former president, and the Alpha Kappa Kappa Medical Society.

His widow, two sons, a daughter, a brother and three sisters survive him.

associates, circulatory collapse was induced in the volunteer subject by the oral administration of 2 to 3 gr of sodium nitrite. There was no or slight effect on the subject in the horizontal position but if he was suddenly tilted up to an angle of 75 or 90 degrees, syncope was an immediate result. If slowly tilted to 70 degrees, a state was obtained in which the systolic blood pressure stayed roughly at 60 or 70, consciousness was maintained but the mental horizon was definitely narrowed, the heart rate rose, and there was an ashen pallor and beaded perspiration. This state progressed gradually, as the blood pressure dropped, and the picture simulated exactly that commonly seen in certain infectious diseases and described in circulatory collapse. If sufficient time had elapsed, the experimental subject would have gone into a state of shock. Therefore, one may postulate a common etiology for syncope, going on to collapse and then shock.

In all three states there is a disproportion between the circulating blood volume and the total vascular volume, there is a decrease in the return flow of blood to the heart, and also an acute or subacute cerebral anoxia. In ordinary syncope there is a temporary pooling of blood in the peripheral vascular system, in circulatory collapse the return is less rapid than in syncope, in shock, even if the balance is restored by one means or another, the patient will not return to normal for some time, perhaps never, or in other words, some permanent damage has occurred. Shock can be defined as a condition with a tendency to a irreversible process, whereas syncope and collapse are usually reversible.

In the literature, the terms 'collapse and shock' are used interchangeably by many. There have been no very satisfying classifications, and the distinction between medical and surgical shock in particular is unwarranted.

From the point of view of treatment it is important to know whether collapse and shock are due (1) to the loss of some normal body constituent or (2) to the action of some substance produced in the body of some extrinsic agent. Treatment is dramatic, prognosis excellent in the first or the deficiency type, treatment is much more difficult and prognosis much poorer in the second or toxic type.

Dr Weiss recapitulated by showing several charts, the results of his experiments. The decrease in return of blood flow may reach values of 30 to 40 per cent below normal before acute circulatory collapse supervenes, and even more if produced gradually. Vein stretchability is a definite factor in the pooling of peripheral blood. Epinephrine has no effect on collapse induced by nitrite, and pitressin accentuates the collapse.

A few special features of circulatory collapse and shock as regards treatment were presented. Dr Weiss believes that too much emphasis has been placed on watching the course of arterial blood pressure in cases where collapse is a possibility. The arterial pressure is not a measure of blood flow. Thus, due to arteriolar constriction, the blood pressure may be normal but the flow very poor. On the other hand, when there is arteriolar dilatation, the blood pressure drops and the pulse rate falls, and yet no fainting occurs because the blood flow is good. Adrenalin thus may have little effect on blood pressure as compared with its marked action on the rate of blood flow. The clinical picture is one of anxiety, pallor and perspiration, and is typical of circulatory collapse. The diagnosis of collapse is warranted, in spite of the fact that the arterial pressure is normal. Certain persons may maintain a low pulse in the presence of collapse because their controlling vagal mechanism is peculiarly sensitive. Anesthesia collapse is probably due in part to an increased tendency to collapse

depending on the nature of the specific clinical condition, on fear, debility, and so forth. Superimposed on this there is the intrinsic effect of the anesthetic and of the surgical trauma. Cold is a factor in collapse, as in diabetic coma. The suddenness with which collapse comes on is explained on a basis of high activity of the reserve peripheral mechanisms, these reserves maintain normal balance for a definite length of time.

Recent efforts have been directed toward determining the degree of predisposition to collapse and shock in normal persons. One has not been able to foretell such a tendency, since powerful longshoremen fall victims as readily as do asthenic individuals. Certain tests with histamine have been used preoperatively abroad, but their value is still doubtful. There are certain general predisposing factors: (1) the patient's mental state, (2) a low blood sugar, or starvation, (3) fear, which is very significant in explaining certain serum reactions, (4) the heavy-set, plethoric individual, (5) advancing age, (6) sex.

Dr Weiss presented a summary chart of measures for prevention and treatment. Specifically, deficiencies are to be supplied, such as water, salts, blood, oxygen, protein, glucose, 'cortin,' heat, and certain vitamins, such as vitamin B<sub>1</sub> in beri-beri, abnormal factors are to be eliminated or remedied, such as sleeplessness, fear, pain, toxins, and chemical poisons. Symptomatically, the following measures are instituted to improve the circulation in general: shock position, heat or cold, blood transfusion, the administration of glucose, sucrose or gum acacia, sodium bicarbonate for the acidosis which usually develops. The value of drugs, such as strychnine, caffeine, coramine, cardiazol, ephedrine, and amphetamine (Benzedrine), epinephrine, synephrine, paredrinol and pitressin, was discussed.

The discussion of Dr Weiss's paper was opened by Dr Herrman L. Blumgart. The distinction between congestive heart failure and peripheral circulatory collapse is that in the former the veins are engorged, in the latter they are empty. He and Dr Altschule had found that it took more than 20 cc of physiological saline or 5 per cent glucose solution per minute intravenously to increase the work of the heart up to 100 per cent. In treating collapse, then, one should give 40 to 50 cc. of fluid per minute, but with careful attention to the patient's response. They also found that amphetamine raised the blood pressure without increasing cardiac output, as does epinephrine. Recent postmortem research has demonstrated conclusively that collapse causes changes in certain organs as a result of thrombosis of the vessels.

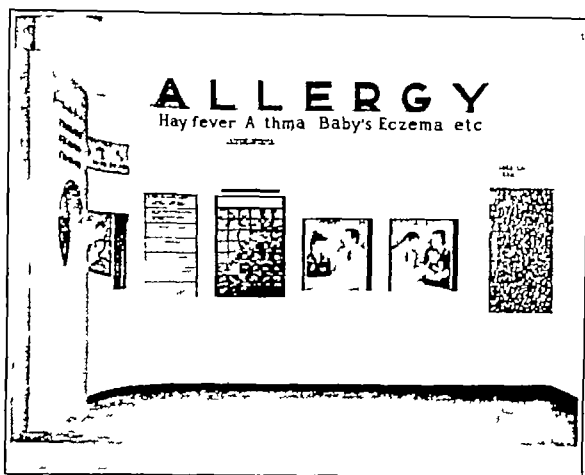
Dr Charles G. Mixer discussed the subject of surgical shock. Primary shock is rare at present, being largely due to industrial or automobile accidents. Secondary shock is relatively common and is distinguished by not coming on until about forty-eight hours after the original injury. Whereas primary shock is best treated by immediate operation, secondary shock does much better after long delay, — of days, if necessary, — during which time the patient is reassured and his physiological balance restored as much as possible. The surgeon then must choose a proper form of anesthesia, induce good sedation, and see to it that the necessary amount of heat is supplied and that the head is kept in a lowered position. The incision should be wide so as to forestall pulling and stretching of structures.

Dr Jacob Fine brought up the question of primary 'peritoneal' shock, and emphasized the importance of psychogenic factors in treatment and prevention.

Dr Weiss answered several questions put to him by physicians in the audience. He had had no experience

old horse, you saved my daddy's life! A postscript" deals with sulapyridine.

The exhibit on allergy tells, in changing dramatic sequences, three two-minute dramas of allergy: Tommy Todd's Autumn Colds; "Mrs. Tucker's Wheezes" and



'Baby Bing's Eczema.' By means of an animated question box and dioramas showing typical scenes in the doctor's office, a search for the offending allergic excitant in each of the three stories is conducted through information obtained by questions, scratch tests and an examination of the patient's family tree. An interesting part of the allergy exhibit is an illuminated transparency chart showing in full color, forty-eight of the most common allergic excitants. A separate series of little pictures invites the visitor to examine commonplace scenes for causes of allergy and then, by pressing buttons, to illuminate the concealed answers.

Physicians visiting the New York World's Fair are entitled to exclusive privileges to the Professional Club in the same building. Admission is obtained by simple identification as a doctor, without charge.

## CORRESPONDENCE

### ANNUAL DISCOURSE

*To the Editor* Before drawing conclusions from my paper in Worcester regarding medical practice in Massachusetts, it is only fair to all concerned that those who did not hear me speak should read *all* that I said and not depend on abstracts which do not indicate the friendly, co-operative spirit in which the subject was presented. I understand that very shortly you are to print the entire paper, and I trust it will receive as much attention as the few excerpts which appeared in the press.

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## REPORTS OF MEETINGS

### GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society was held in the Beth Israel Hospital Auditorium on Tuesday, February 7. Dr. Louis M. Freedman presided and introduced the speaker of the evening, Dr. Soma Weiss, who spoke on 'Etiological Factors and Therapeutic Measures in Circulatory Collapse and Shock.'

Dr. Weiss stated that in the general field of diseases of the cardiovascular system, the three main disturbances are heart disease and congestive failure, arterial hypertension, and circulatory collapse. Of the three, the last is of the greatest importance and has been studied at the Thorndike Memorial Laboratory during the past eight years.

Circulatory collapse, or acute disintegration of the peripheral circulatory system, is by no means the same thing as congestive heart failure, and is commoner. The distinction between the two is important for therapeutic reasons, for example, in pulmonary edema with cardiac asthma venesection may be a life saving measure, whereas in pulmonary edema with circulatory collapse, venesection may lead to death. However, the distinction must not suggest a too arbitrary segregation of the two conditions, for they may co-exist. Such is sometimes the case in diphtheria, for example, or in beri-beri, with an affection of both the heart and the peripheral vascular system. Certain drugs, such as the barbiturates, may also produce this picture. Even congestive heart failure itself may be complicated by peripheral circulatory collapse.

Peripheral circulatory collapse has been variously described as syncope, collapse and shock. The study of shock in animals and man is an old one. Dr. Weiss and his co-workers became interested in the hemodynamics of shock as a result of previous work in carotid sinus syncope.

Dr. Weiss first discussed vasomotor reactions in normal subjects. The peripheral vascular system (of which the arterioles and venules are the most important elements) has as great a significance as the heart. Thus the capacity of an athlete depends not only on his having a good heart, but also on the state of response or "condition" of his peripheral vascular system, and the degree of economy with which it functions. In heart disease, the peripheral vascular system has great compensatory powers. Arteries, arterioles, capillaries, venules and veins all have their capacity for independent action, when tested with epinephrine, choline, histamine, nitrites, and so forth, and there is a wide variation in the response to these in each individual. This has an important bearing on the tendency to collapse or shock. Slides were shown, describing graphically the results of experiments, such as the effect of a loud noise or a deep breath. Epinephrine causes a rise in systolic pressure, a drop in diastolic pressure, and a rise in pulse rate, the plethysmograph recorded a rise in blood flow through the forearm but a drop in that of the hand and foot. This latter is explained on the basis that the forearm consists mostly of muscle and has relatively little skin.

Dr. Weiss next considered the disturbances of the vasomotor system. A healthy, normal individual watching a parade on a warm day might suddenly become weak and turn pale, with an ashen color and beads of perspiration, and finally, in from 10 to 20 seconds, might collapse and become unconscious. His arterial pulse will be weak or absent, the heart rate first rapid and then slow, the blood pressure low or indeterminate. This is 'vaso-vagal syncope,' a benign condition but nevertheless alarming.

In another case, a patient with severe, acute pancreatitis also might suddenly turn pale and ashen gray, with beads of perspiration on his forehead, a rise in heart rate, a drop in blood pressure, and a drop in pulse rate. This, lasting for 5 to 20 minutes is circulatory collapse—a serious syndrome. If this state lasts for several hours or even days, it is called 'shock.' Obviously there must be something in common between these three conditions.

In a particular study carried out by Dr. Weiss and his

SEPTEMBER 15 28 — Pan Pacific Surgical Association Page 863 issue of November 24  
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 DECEMBER 2 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15  
 MAY 14 1940 — Pharmacopoeial Convention Page 894 issue of May 25  
 JUNE 7 8 9 1940 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15

## BOOK REVIEWS

*Human Gastric Secretion* Bengt Ihre. Acta Medica Scandinavica Supplement 95 226 pp Stockholm, 1938

Ihre has made careful quantitative studies of the enzymes, acidity and total chloride in the gastric juice of 24 normal and 70 pathologic cases. For this study he emphasized the importance of a choice of method in obtaining specimens which would prevent the loss of juice through the pylorus, the admixture of duodenal juice due to regurgitation in the stomach and the admixture of saliva. He used, therefore, two Rehffuss tubes combined in the double tube of Lagerlöf and Agren. With this tube in place he could obtain gastric and duodenal juices quantitatively and separately. The saliva was avoided by continuous suction from the mouth. The juices were collected by continuous suction and routinely fractionated in twenty minute periods. In order to get gastric juice after both humoral and neural stimulation, both histamine and insulin were used separately in every case. Insulin hypoglycemia was shown to be an excellent vagal stimulant. The determinations of acidity and total chloride were done electrometrically, and determination of pepsin according to the method of Willstätter and Waldschmidt Leitz.

Studying the primary acidity and the regulation of acidity in special experiments he obtained support for the theory of Pavlov of a high and constant primary acidity. He concludes that the regulation of acidity mainly takes place through back diffusion of hydrogen ions through the gastric wall in accordance with the theory of Teorell and through the secretion of mucus which acts as a diluter and to a slight degree as an acid-binder.

The normal material consists of healthy individuals showing the least possible effect of the acidity reducing factors. It was found that this was the case in individuals in the twenties, while with increasing age the acidity reducing factors become more and more effective and a strictly physiologic secretion gets more uncommon. The highest acidity and total-chloride values were found in the normal series, and here the rates of secretion showed comparatively greater variations than did the values for the acidity and the chlorides. The same acidity values were encountered in men and in women, but in women there was a tendency toward a lower rate of secretion and they showed hypersecretion less often than did men.

The study of the pathologic cases was limited to gastric and duodenal ulcers, chronic gastritis and finally pernicious anemia. All cases were studied from the clinical point of view and were subjected to gastroscopy. On the whole, individuals with gastric ulcers showed a normal rate of secretion, while in most of those with duodenal ulcers there was more or less marked hypersecretion. In chronic gastritis without ulcer the tendency was clearly toward hyposecretion. Higher degrees of acidity than normal were not observed, and he concludes that the concept of hyperacidity lacks actual foundation. The majority of the pathologic cases showed lowered acidity. This is due

to the greater effect of the acid-reducing factors in the pathologically altered stomach, that is, increased back diffusion of acid due to alteration of the mucous membranes. A correlation between total chlorides and acidity was noted when the acidity declined or disappeared the chlorides did not fall below 120 milliequivalents per liter. Lower values are unquestionably due to admixtures of saliva.

Pepsin secretion is greatly accelerated by the vagal stimulation occurring in insulin hypoglycemia. Usually the pepsin elimination then reaches values two to three times greater than those before the stimulation. He established upper and lower limits for normal pepsin secretion and the existence of hyperpepsinia and hypopepsinia. When the vagal tonus is altered, variations in pepsin elimination depend on the rate of flow of gastric juice. Histamine and caffeine, which stimulate the secretion of gastric juice but do not produce any change in vagal tonus, have no effect on pepsin production.

When studying the secretion of pepsin it is necessary to know the amount secreted during a certain period, for the mere concentration in a sample collected over a short period is of little value. In this respect pepsin differs from acidity, which is high when the flow of gastric juice is high while the pepsin concentration tends to drop under the same conditions. The behavior of pepsin resembles that of the enzymes in the pancreatic juice, while the gastric acidity acts like the bicarbonate in the pancreatic juice. In this study sixty minute collections were used to evaluate pepsin secretion.

Since histamine has no effect on pepsin production, it was only from vagal stimulation that the pathologic deviations in pepsin secretion became fully apparent. A great number of patients with gastric and duodenal ulcers and gastritis without ulcer showed pepsin secretion within normal limits. Different degrees of hypopepsinia were common features in gastritis, particularly in women it was much less common in ulcers. Hyperpepsinia and hypersecretion may occur independently of each other, they are, however, usually correlated although not in the sense of cause and effect. They were present simultaneously in chronic ulcers of the stomach and duodenum, particularly in the latter. Hyperpepsinia, like hypersecretion, was less common in women than in men.

*Trauma and Internal Disease A basis for medical and legal evaluation of the etiology—pathology—clinical processes—following injury* Frank W Spicer 593 pp Philadelphia, London and Montreal J B Lippincott Co, 1939 \$7.00

Dr Spicer states in his preface that this study was prompted by the many problems which arise daily in the various courts of law relative to the causation or aggravation of disease by injury. He disclaims any intention of writing a book on traumatic surgery, but observes that the more that is known of the pathological processes following injury the more intelligent will be the adjustment of claims. His primary object, then, is to aid those concerned with such adjustment by supplying an authoritative book of reference, and this has been accomplished by a compilation of cases and of the opinions of authorities from the literature, chiefly English and American. The twenty five chapters deal with injuries classified according to the physiological system and the anatomical region involved, with the addition of special sections dealing with the relation of trauma to particular diseases, notably tuberculosis, peptic ulcer, appendicitis, diabetes, exophthalmic goiter, leukemia, arthritis, syphilis, tumors and electrical

with the application of tourniquets to the limbs in collapse but advised strongly against it. He said it is, of course, of benefit in cardiac asthma. As for alcohol in treatment, Dr Weiss believes it should be more generally used since it is a good ready fuel and is also an analgesic. Hemoconcentration is of no value as an indicator of circulatory collapse, since there is no change except in the late stages. Likewise there are no changes in the chemical constituents of the blood except in late stages.

### WILLIAM HARVEY SOCIETY

At a regular monthly meeting of the William Harvey Society of Tufts College Medical School on Friday, April 14, in the Beth Israel Hospital auditorium, the speaker was Dr Philemon E Truesdale, of Fall River. Dr Truesdale chose as his subject Diaphragmatic Hernia.

The first part of the evening, Dr Truesdale read a summarizing review of the symptomatology of diaphragmatic hernia. There is interference with three of the most important body functions: circulation, respiration and digestion. Symptoms are characterized by their diversity and number. So far as the circulation is concerned, there is interference with the venous return to the heart, and the heart is moderately or markedly displaced, with torsion of the great vessels. Sometimes these conditions give no symptoms, but at other times there may be all the symptoms of cardiac disease. As the lungs are encroached on, hoarseness, a dry cough, air hunger, cyanosis and collapse may develop, besides other manifestations of pulmonary disease. The disturbance of the gastrointestinal tract leads to even more and various symptoms. Such symptoms are usually provoked by food immediately after ingestion, as are the circulatory and respiratory manifestations. The picture of intestinal obstruction may develop as a result of constriction of the colon at the diaphragmatic stoma.

Dr Truesdale made a distinction between eventration and hernia of the diaphragm. The former may be either congenital or acquired as the result of injury to or paralysis of the phrenic nerve. Both forms may co-exist.

Since the symptomatology is so complex, a differential diagnosis is often difficult until the barium or bismuth meal demonstrates the lesion by x ray. A few cases were first diagnosed as tuberculosis of the lung. In acute pancreatitis the left diaphragm may be high, but the blood diastase is elevated, as it is not in eventration of the diaphragm. The symptoms may suggest heart disease quite strongly, or may lead to a diagnosis of enlargement of the thymus. In the very young, the cough may be mistaken for that of pertussis, or the gastrointestinal symptoms of obstruction may lead to a diagnosis of congenital atresia of the bowel. Gall bladder disease in general gives pain at midnight or later and is usually associated with certain diets, whereas diaphragmatic hernia usually gives rise to pain in the daytime and after any sort of meal. The pain is also more constant than it is in peptic ulcer.

Dr Truesdale continued to instruct and entertain for the remainder of the evening by going through his extensive series of cases of diaphragmatic hernia and by illustrating with lantern slides.

Association, 554 Columbus Avenue, Boston, on Tuesday, June 27, at 12 o'clock noon. Dr Oscar Auerbach, pathologist, Sea View Hospital, New York City, will speak on "Pathogenesis of Empyema in Chronic Pulmonary Tuberculosis" and will show lantern slides.

Physicians are cordially invited to attend.

JOHN B HALL, M.D., *Secretary*

### CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	ORTHOPEDIC CONSULTANT
Haverhill	July 5	Arthur T Legg
Lowell	July 7	Albert H Brewster
Salem	July 10	Harold C Bean
Gardner	July 11	Mark H Rogers
Brockton	July 13	George W Van Gorder
Pittsfield	July 17	Francis A. Slowick
Northampton	July 19	Garry deN Hough, Jr
Worcester	July 21	John W O'Meara
Fall River	July 24	Eugene A. McCarthy
Hyannis	July 25	Paul L. Norton

### SALEM HOSPITAL TUMOR CLINIC

There is to be a teaching Tumor Clinic at the Salem Hospital, June 30, at 9 a m., to be presided over by Dr Channing Simmons, of Boston. Interesting cases seen and treated in the clinic during the past several months will be presented and methods of treatment reviewed.

### SOCIETY MEETINGS AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 26

##### MONDAY JUNE 26

National Tuberculosis Association Hotel Statler Boston

##### TUESDAY JUNE 27

National Tuberculosis Association Hotel Statler Boston

\*10 a m. 12 30 p m Boston Dispensary tumor clinic

\*12 m. South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston

##### WEDNESDAY JUNE 28

National Tuberculosis Association Hotel Statler Boston

##### THURSDAY JUNE 29

National Tuberculosis Association Hotel Statler Boston

##### FRIDAY JUNE 30

\*10 a m. 12 30 p m Boston Dispensary tumor clinic

##### SATURDAY JULY 1

\*10 a m. 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

\*Open to the medical profession

JUNE 26-29 — National Tuberculosis Association Page 897 issue of May 25

JUNE 27 — South End Medical Club Notice above.

JUNE 27-29 — Medical Library Association Page 941 issue of June 1

JUNE 29 — Pentucket Association of Physicians 8 30 p m Hotel Whittier 5 Washington Street Haverhill

JUNE 30 — Salem Hospital Tumor Clinic Notice above.

AUGUST 30 SEPTEMBER 2 — Seminar in Physical Therapy Page 857 issue of May 18

SEPTEMBER — Boston Psychoanalytic Institute Page 450 issue of September 22

SEPTEMBER 4-6 — Institute for the Consideration of the Blood and Blood Forming Organs. Page 941 issue of June 1

SEPTEMBER 5-8 — American Congress of Physical Therapy Page 857 issue of May 18

SEPTEMBER 11-15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8

SEPTEMBER 14-16 — Biological Photographic Association Page 941 issue of June 1

## NOTICES

### SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis



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## ASCORBIC ACID REQUIREMENTS IN PATIENTS WITH PEPTIC ULCER\*

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EDWARD S EMERY, JR., M.D.§

BOSTON

THERE are several reasons for investigating the vitamin C nutrition of patients with peptic ulcer. It has been recognized for many years that the usual diets prescribed for patients with an ulcer may be deficient in ascorbic acid. Cases have been reported of the development of scurvy in patients who had followed such diets for a long time.<sup>1</sup> Furthermore, it has been reported that guinea pigs have developed gastrointestinal ulcerations on diets low in or devoid of vitamin C.<sup>2</sup> In a preliminary study,<sup>4</sup> one of us (H A W) found that the blood plasma in 90 per cent of patients undergoing treatment for peptic ulcer gave a low value for this vitamin. Archer and Graham<sup>3</sup> have reported similar findings.

In a discussion of the cause for these low values, Ingalls and Warren<sup>4</sup> suggested three possibilities: namely an inadequate intake of vitamin C, the destruction of the vitamin in the gastrointestinal tract before absorption could take place, and an increased utilization of the substance by the tissues.

The present report deals with the daily requirement for ascorbic acid of patients with an active duodenal ulcer. Van Eekelen,<sup>6</sup> Heinemann<sup>7</sup> and Van Wersch<sup>8</sup> have found that normal persons when saturated with vitamin C utilize from 0.70 to 0.84 mg of the vitamin per kilogram of body weight per day. These figures represent the optimal requirements and are considerably greater than is necessary to protect against scurvy. Göthlin, Frisell and Rundqvist<sup>9</sup> have shown that 0.4 mg per kilogram of body weight per day is sufficient to prevent abnormal capillary permeability. Furthermore, Van Eekelen reports that smaller amounts of vitamin C are utilized by the body when the level of tissue saturation decreases. Beyond the point of saturation, any excess of the vitamin is rapidly excreted in the urine.

It has already been shown that in the presence of disease the body may utilize increased amounts of ascorbic acid. Heinemann,<sup>10</sup> as well as Heise and Martin,<sup>11</sup> has demonstrated that patients with tuberculosis utilize as much as two or three times the normal amount, hence it seemed desirable to determine the amount of vitamin C utilized by patients with active duodenal ulcer.

### METHOD

Previous work suggests that the amount of ascorbic acid in the plasma may not give a good index of the degree of tissue saturation and is of little value in showing how much ascorbic acid is used by an individual. The saturation test devised by Van Eekelen<sup>6</sup> and by Heinemann<sup>7</sup> appears to yield an accurate index of the tissue saturation and enables one to determine how much of the vitamin is actually utilized by the tissues. Therefore this method has been used in carrying out the present study.

The test consists of saturating the body with vitamin C, allowing some days to elapse, during which time the patient receives only minimal amounts of ascorbic acid, and determining the amount necessary to resaturate the body. It is considered that a state of saturation exists when a moderate dose of ascorbic acid produces a very definite excretion into the urine.

During the period of the test ascorbic acid may be lost in either of two ways: through utilization by the tissues or by excretion in the urine. The amount that is utilized by the body can be readily estimated by determining the amount excreted in the urine and subtracting this from the total amount to bring the tissues to the second saturation. The amount of ascorbic acid which the body requires per day is obtained by dividing the amount of the vitamin which has been utilized by the number of days through which the test was run. The final result is ex-

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injuries Penetrating wounds and fractures, being manifest in their effects, are spoken of but briefly for the sake of thoroughness. Each chapter is thoroughly documented by references, and an adequate author and subject index is supplied.

Any observer of the contemporary scene will agree that the prevailing viewpoint is that any illness, accident, misery or unhappiness is the fault of society and should receive material compensation—from financial heart-balm for unrequited affections, through physical trauma, to allegedly libelous injuries to reputations. In the field of trauma, it would appear that Dr. Spicer has collected evidence to show that it may be responsible for practically every ill that flesh is heir to. He defines trauma as 'a single or repeated mechanical injury resulting in contusion, crushing or laceration of the tissues' (Ewing), but apparently accepts psychic trauma, as for instance in exophthalmic goiter. With our present knowledge, imperfect though it is, of the profound influence of the endocrine glands, of the hormones and of the sympathetic nervous system on the circulation and on cellular metabolism, it would be unwise to deny the possible effect on disease of trauma acting through these agencies, but some of the author's examples of the responsibility of trauma seem far-fetched. A few examples may be pertinent. A man falls 5 feet and lands on his sacrum, has brief unconsciousness, complains of pain in the neck and at autopsy, twenty two days later, there is demonstrated acute epidemic encephalitis, the injury is adjudged to be the cause (p. 52). Is it not more likely that the intracerebral lesions of the incipient disease caused the fall? Narcolepsy may be the result of an injury antecedent by 'several years' (p. 82). Torsion and gangrene of the omentum may be due to the exertion of putting up storm windows (p. 290). Peptic ulcer may be caused by a contusion 'occasionally the violence involves a portion of the body distant from the abdomen, the indirect forces acting along the principles of contrecoup' (p. 306). Quoting Osler and Kelly, 'Trauma plays a definite role in acute appendicitis, the length of time elapsing between the injury and the first symptoms being from none to two years' (p. 366). 'Trauma may injure the graafian follicle or corpus luteum, without gross injury to the pelvic organs, sufficiently to cause many menstrual disorders' (p. 430). 'Falls upon the feet may cause diabetes' (p. 442).

This reviewer does not mean to suggest by these examples that the book is not written with sincerity, but it seems fair to say that Dr. Spicer is presenting in the affirmative the case for the responsibility of trauma in causing internal disease. There are very few, if any, citations of authorities for the negative perhaps such are not to be found in the literature! Dr. Spicer rarely presents his own opinion except as it may be inferred from his summaries of quoted authorities. This book should be an invaluable source book for physicians, patients, attorneys, clients, courts, industrial commissions and insurance companies. To the ten million persons who are said to suffer accidents in the United States every year, it will offer encouragement and aid in obtaining pecuniary relief in carrying the burden of illness. If conscientiously employed it will doubtless be a factor in promoting the just obligations of society to its members.

*Industrial Surgery Principles, problems and practice*  
Willis W. Lasher. 452 pp. New York: Paul B. Hoeber, Inc., 1938. \$6.00.

Prof. Lasher brings together in the earlier chapters the ideal setup for the handling of industrial cases requiring surgical treatment. He advocates a unit equipped accord-

ing to the size of the industrial plant and the nature of the injuries to which the employees are most liable, and a personnel adequate to give the service necessary. Typical forms on which careful records are to be kept are illustrated.

After consideration of general surgical conditions, the regional method is followed, beginning with finger and hand injuries and continuing with the other parts of the body, including a consideration of peripheral nerve injuries, bursas, fracture-dislocations, and so forth. The New York Labor Board's method of assessing losses as a basis for compensation for the various injuries is outlined. A number of admirable suggestions are made to aid in distinguishing between the three types of malingerers which the author recognizes. Illustrative cases are cited to emphasize points he wishes to bring out.

Though necessarily brief, the recommendations for treatment are clearly given and are based on the experience the author has had over a number of years as the director of the Employers' Liability Assurance Corporation, of New York. As befits an official in that position he probably would be classed as an ultraconservative. In certain subjects, like that of hallux valgus, for example, his opportunity to follow the surgical treatment of that deformity in industrial cases has not perhaps been extensive, accounting for his advocacy of surgical measures, in cases deemed suitable for operative treatment, that are not generally employed and for a reason not commonly advanced. In discussing the diagnosis of knee joint lesions he records his experience with a method of examination which is all too little employed in this country, namely inflation of the joint with air to aid in bringing into high relief structures not otherwise clearly seen in an x-ray film. The same method is followed in joints of the lower extremity, the spine and the pelvic girdle. The last few chapters he devotes to such matters as hernias, cranial and facial injuries, those of the abdominal and thoracic viscera, the jaw and the neck and a miscellaneous group. In an appendix, a well illustrated section is devoted to describing splints and certain tools commonly used in handling industrial accident work.

The book will be found very helpful to anyone engaged in this type of surgery and indeed it is worth having on the shelves of any practitioner's library.

*Pediatric Symptomatology and Differential Diagnosis*  
Sanford Blum. 500 pp. Philadelphia: F. A. Davis Co., 1938. \$5.00.

A reviewer—unless he be an utter misanthrope—is always pained to find a book of which he can say not one kind thing, but he is so circumstanced here. A treatise of this sort, to be worth its salt, ought to be both up to date and thoroughly comprehensive in scope, and this is neither. One might almost suspect, indeed, that it had been held in manuscript since about 1913, so far do its matters and, conspicuously, its point of view lag behind the times. As a test for its degree of obsolescence, let anyone turn, for example, to the sections on pneumonia and tuberculosis. For the rest, there are many subjects omitted altogether, such as renal rickets, oxycephaly, osteopetrosis, Schüller-Christian's disease, acrodynia, erythroblastic anemia, undulant fever, nephrosis and trichinosis. Granted that these are all uncommon conditions, it is precisely the uncommon that is most likely to send a man to a specialized volume on diagnosis.

There are many books, of course, which would be the better for some revision, but this is so faulty in all respects as to convince one that no amount of revision could ever make it useful.

unable to absorb the drug when given by mouth. It was also found that these patients had been taking diets deficient in vitamin C. It is pointed out that the usual Sippy diet contains much less than the normal requirement of vitamin C. If it is desired to meet this deficiency it is easy to make up the vitamin C requirements by including in the daily diet the juice of one or two good-sized fresh oranges.

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## FRACTURE OF THE FIRST RIB DUE TO MUSCLE PULL

## Report of a Case

ALEXANDER P AITKEN, M.D.\* AND ROBERT E LINCOLN, M.D.†

BOSTON

**F**RACTURES of the first rib unassociated with other fractures are very rare. Breslin<sup>1</sup> has recently reviewed the literature and found 27 cases, to which he added 5 of his own. Lane<sup>2</sup> states that fracture of the first rib can take place in only one of three ways, by indirect violence, the force being transmitted through the clavicle, directly by means of force applied from behind, or indirectly, by force being transmitted through the manubrium.

Although most of the reported cases have been due to one of these mechanisms, there are 2 cases in the literature in which the fractures were said to be due to muscle pull.<sup>3,4</sup> That fracture of the first rib can be due to muscle pull, particularly that of the scalenus anticus, is shown by the following case.

## CASE REPORT

The patient was a well-developed and well-nourished white man 29 years of age. He had placed on his head a load of cardboard weighing approximately 50 pounds. Steadying the load with his right hand, he had climbed three steps of a stepladder when it suddenly tipped to the left. Endeavoring to maintain his balance, he jerked his head forcibly to the right, and as he did so felt a snap in the left side of the neck, followed by severe pain, localized partly in the neck but chiefly over the posterior aspect of the left shoulder. He also experienced sharp pain radiating down the upper arm and the inner side of the forearm. With the onset of pain there developed immediate rigidity of the neck. Within 48 hours the acute pain subsided and the patient returned to work. The pain in the neck and shoulder and the stiffness persisted for the 1st week and then subsided. At the end of

the 3rd week he was symptom free. Twenty-six days following this injury the patient was in the act of pulling back a bedspread with his right hand when he again felt



FIGURE 1 Arrow points to fracture

a violent snap in the left supraclavicular fossa followed by extreme pain felt chiefly over the posterior aspect of the left scapula. Any motion of the body, especially respiration, made the pain excruciating and caused it to radiate

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pressed in terms of the number of milligrams of ascorbic acid per kilogram of body weight per day

### RESULTS

Saturation studies were carried out on 5 patients with active duodenal ulcers. They had been on diets presumably low in vitamin C for periods ranging from one week to seven years preceding their admission to the hospital. During the period of study all received either the first- or fourth-week Sippy diet, together with alkaline powders or colloidal aluminum hydroxide. The following daily requirements were found to be necessary to maintain saturation in the five patients: 1.20, 0.91, 1.10, 1.02 and 1.05 mg of ascorbic acid per kilogram of body weight per day (Table 1).

TABLE 1 *Daily Requirements of Ascorbic Acid*

SUBJECT	AGE yr	SEX	WEIGHT kg	ASCORBIC ACID REQUIREMENTS	
				mg per day	mg per kg per day
B. L.	40	M	71.7	86.2	1.20
K. E.	50	M	54.7	57.6	1.05
R. E.	53	M	51.6	57.3	1.10
S. H.	43	M	59.2	60.9	1.02
M. A.	35	F	62.7	57.1	0.91

The average for this series was 1.02 mg. This is 20 per cent greater than Van Eekelen<sup>6</sup> and Heinemann<sup>7</sup> found for normal subjects. Since this investigation was started Heinemann<sup>12</sup> has reported similar studies of 4 patients with peptic ulcer. He also found a slightly higher requirement. The average of his 4 cases was 1.25 mg.

### DISCUSSION

The findings in this study, together with those of Heinemann, show that patients with peptic ulcer utilize somewhat more ascorbic acid than do normal individuals. However, this increased amount is so small that it can be supplied by the juice of one or two good-sized oranges.

The fact that these patients utilize a somewhat greater amount of ascorbic acid makes it all the more necessary that their diet shall contain an adequate amount of this substance. It is also true that many of the diets which are used in the treatment of peptic ulcer are low in this vitamin. We have assayed the amount of ascorbic acid in the first-week Sippy diet and found that it contained approximately 5 mg of ascorbic acid per day. The fourth-week Sippy diet contained approximately 15 mg. These amounts vary considerably depending on the amount and the freshness of the fruits and vegetables taken, however, they compare favorably with the estimated amount in such a dietary as calculated from published re-

ports on the amount of ascorbic acid contained in foods. According to the figures obtained by us, a person with a duodenal ulcer, weighing 150 pounds, utilizes about 70 mg of vitamin C a day. It seems evident that the low plasma values reported by others in cases of peptic ulcer may have been the result of a low intake. We have no reason to suspect that there was an abnormal destruction of the vitamin in the gastrointestinal tract, or any failure of absorption. Moreover, Heinemann administered the ascorbic acid by subcutaneous injection in 2 patients and found no difference in his results from the 2 other patients who received the vitamin by mouth. The inadequacy of the Sippy diet in maintaining saturation is also emphasized by the relatively large amounts of ascorbic acid needed to produce a second saturation in our patients. As much as 1800 mg of ascorbic acid was required to resaturate a patient after receiving a Sippy diet for three weeks.

The question now arises as to how much ascorbic acid should be given to a patient with peptic ulcer. It is fair to say that there is no evidence in the clinical picture of peptic ulcer, and more particularly in the rapidity of healing of these ulcers under the Sippy regime of dieting and neutralization of gastric acidity by alkalis, to suggest ill effects from this deficiency in ascorbic acid. In our opinion there is no reason for complicating the dietary problem of the ulcer patient by the addition of foods rich in ascorbic acid or of ascorbic acid itself, until it is demonstrated that ulcers will heal faster and recur less under higher ascorbic acid intake. However, if the physician desires to increase the vitamin C intake this can easily be done by recommending doses in excess of that utilized by the body for several days and then prescribing amounts which the individual will utilize throughout the period of active treatment. One can give 200 mg a day for a period of one or two weeks, depending on the previous intake of vitamin-C-containing foods, then 75 mg a day for two or three weeks longer. At the end of this time a patient should be able to obtain an adequate amount of vitamin from his diet. If for any reason those foods which contain a large amount of vitamin C, such as orange juice and tomato juice, are contraindicated, the deficiency can be made up by prescribing crystalline ascorbic acid.

### CONCLUSIONS

Studies have been made on the requirement of ascorbic acid by patients with peptic ulcer. It was found that 5 patients with duodenal ulcer utilized 20 per cent more ascorbic acid than do normal individuals. There was no evidence that they were

unable to absorb the drug when given by mouth. It was also found that these patients had been taking diets deficient in vitamin C. It is pointed out that the usual Sippy diet contains much less than the normal requirement of vitamin C. If it is desired to meet this deficiency it is easy to make up the vitamin C requirements by including in the daily diet the juice of one or two good-sized fresh oranges.

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## FRACTURE OF THE FIRST RIB DUE TO MUSCLE PULL

## Report of a Case

ALEXANDER P AITKEN, M.D. \* AND ROBERT E LINCOLN, M.D.†

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**F**RACTURES of the first rib unassociated with other fractures are very rare. Breslin<sup>1</sup> has recently reviewed the literature and found 27 cases, to which he added 5 of his own. Lane<sup>2</sup> states that fracture of the first rib can take place in only one of three ways, by indirect violence, the force being transmitted through the clavicle, directly by means of force applied from behind, or indirectly, by force being transmitted through the manubrium.

Although most of the reported cases have been due to one of these mechanisms, there are 2 cases in the literature in which the fractures were said to be due to muscle pull.<sup>3,4</sup> That fracture of the first rib can be due to muscle pull, particularly that of the scalenus anticus, is shown by the following case.

## CASE REPORT

The patient was a well-developed and well-nourished white man 29 years of age. He had placed on his head a load of cardboard weighing approximately 50 pounds. Steadying the load with his right hand, he had climbed three steps of a stepladder when it suddenly tipped to the left. Endeavoring to maintain his balance, he jerked his head forcibly to the right, and as he did so felt a snap in the left side of the neck, followed by severe pain, localized partly in the neck but chiefly over the posterior aspect of the left shoulder. He also experienced sharp pain radiating down the upper arm and the inner side of the forearm. With the onset of pain there developed immediate rigidity of the neck. Within 48 hours the acute pain subsided and the patient returned to work. The pain in the neck and shoulder and the stiffness persisted for the 1st week and then subsided. At the end of

the 3rd week he was symptom free. Twenty-six days following this injury the patient was in the act of pulling back a bedspread with his right hand when he again felt



FIGURE 1 Arrow points to fracture

a violent snap in the left supraclavicular fossa followed by extreme pain felt chiefly over the posterior aspect of the left scapula. Any motion of the body, especially respiration, made the pain excruciating and caused it to radiate

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down the arm and the ulnar side of the forearm. The patient became faint and lay down. As he did so he felt a second snap in his neck. Immediately the acute pain in the shoulder subsided. However, rigidity recurred and motion of the head or arm caused pain in the supraclavicular fossa and over the posterior aspect of the shoulder, with some radiating pain down the ulnar side of the left arm and forearm. When the patient lay quietly, however, he had no pain but had some tingling in the fourth and fifth fingers of the left hand. X-ray photographs taken the day after the second attack of pain revealed a fracture of the first rib on the left side, at the point of insertion of the scalenus anticus muscle (Fig 1).

With immobilization of the head and neck all the acute pain disappeared in a few days. Flexion and extension of the head became normal and painless. Lateral flexion to the left caused pain only when the normal limits of motion were reached. Lateral flexion to the right, however, was completely limited for several days, and any attempt to elicit this motion caused sharp pain over the posterior aspect of the shoulder joint which radiated down the inner side of the arm. At the end of 4 weeks all symptoms had subsided and pain was produced only when the full limits of right lateral flexion were reached. In 7 weeks the patient returned to work and has been symptom free since then.

Because of the history of pain radiating down the left arm following sudden forced flexion of the neck to the right, it was at first thought that the patient was suffering from a scalenus anticus syndrome. The original x-ray photographs did not reveal the fracture of the first rib because of the overlying clavicle. However, films taken after the second onset of pain showed a distinct fracture.

Fractures of the first rib are unquestionably rare, and it is for this reason that this case is presented. Such fractures are not routinely looked for and are difficult to see because of the overlying clavicle. If an examination is made in cases where the patient complains of pain in the posterior aspect of the shoulder following direct or indirect trauma, it may be found that this lesion is not so uncommon as we now believe.

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## TWENTY-FIVE NON-READERS\*

MILTON E. KIRKPATRICK, M.D.†

NEW YORK CITY

WE ARE slowly outgrowing the concept that the child who is slow in learning to read is either dull or mentally lazy. The psychologist has given us valuable assistance regarding reading disability, but there is still a greater contribution to make in remedial training. The visiting teacher and psychiatric social worker have indicated home situations which influenced school progress, and educators are now aware of the relation which exists between failure in learning to read and personality deviations which may develop later. Ideally, each child who experiences difficulty in learning to read should be subjected to an exhaustive analysis with the hope of finding the cause of the trouble. From a practical standpoint this is rarely done. To be sure, many schools give routine intelligence tests of one kind or another, but these are chiefly for the purpose of designating the group whose failure is due to intellectual limitations. The child of normal intelligence who is failing, particularly in reading, presents quite another problem. One authority<sup>1</sup>

states, "In Grade 1, 99 per cent of the pupils failing promotion were marked as failures in reading, in Grade 2 the percentage was 90, in Grade 3 the percentage was 68." The importance of reading in its relation to school failure cannot be questioned.

The present study is not presented as a thorough analysis of a group of non-readers, but is intended rather to call attention to the multiplicity of factors which enter into the problem. Without doubt, learning to read is the most important single accomplishment in the early formal education of the child. Its importance can scarcely be overstressed in its relation either to other subjects in the curriculum or to the broader aspects of living. There is some danger that we may become a nation largely influenced by things we see and hear, and that the vast realm of knowledge which reading makes available will be of decreasing importance as a cultural factor in our daily lives.

The 25 children (19 boys and 6 girls) selected for this study include practically the entire group of non-readers in the first, second and third grades in the school under consideration, excluding those of less than average intelligence. It was our

\*Part of a child guidance project conducted in the public schools of Webster, Massachusetts, by the staff of the Worcester Child Guidance Clinic.

†Formerly director of Child Guidance Clinic, Worcester State Hospital, Worcester, Massachusetts.

opinion that those children who had not learned to read because they were not yet intellectually ready constituted a special group about which we had some definite knowledge. Any child with an IQ under normal limits was therefore excluded. All children had had eye examinations by the school physician and visual defects, when present, had been corrected.

The co-operation of the teachers was assured from the beginning, as they found these non readers a source of considerable concern. In another study we had tried the questionnaire method of getting information, and this was abandoned because of the tendency on the part of the teacher to answer leading questions briefly and to avoid further elaboration. We therefore asked the teachers to write a report on each child, answering the following questions: Does the child like school? How does he get along with his classmates? Is he attentive in the classroom? Does he seem interested in classroom activities? What is his attitude toward failure? Do you consider him a leader or a follower? We established no criteria for the evaluation of these factors, and the objection may be raised that possibly more than the usual amount of subjectivity is involved.

The social workers interviewed the parents of the children, and without exception there was complete co-operation, not only in getting data for this study but in discussing findings and recommendations at its completion. The psychologist gave each child individual reading tests as well as hand-and-eye dominance tests. Each child was interviewed at least once by the psychiatrist after data obtained by others had been collected.

The following material is presented in order that a fair picture may be obtained of the family backgrounds of the children. Eleven fathers and eight mothers were foreign-born. This was in keeping with the population of the town concerned. A foreign language was spoken in ten of the twenty-four homes (2 children studied were from the same family). In three homes practically no English was spoken. One child never learned to speak English until he started school. Only three fathers and four mothers had an education above grammar school. Two parents were college graduates and two were illiterate. In eight families the parents had given some thought to the child's failure to learn to read and had decided that the school was to blame. Such an attitude is in no way conducive to learning on the part of the child. I suspect it occurs more often than we are aware.

It is often stated that reading, like speech, is born of necessity. We know that children will learn to talk when it becomes necessary for them to make their wants known. I have frequently

questioned the advisability of parents' reading to children, thereby relieving them of the necessity of reading for themselves. Nineteen of the children in this study were read to by some member of the family, 14 of these 19 were classed by their teachers as "followers." It would seem that this is an indication of a higher percentage of dependency than we should ordinarily expect. Our findings are not conclusive, but they indicate the general trend.

It was not always possible to obtain detailed information on early development because of the intellectual limitations of the parents. Retardation in teething, walking and talking was noted in 6 children. Ten children were very difficult to train in toilet habits, 1 was untrained until he was three and 1 until after four. The latter phenomenon indicates inadequate methods used by the mothers, but there are other implications as well, it suggests an early personality deviation. The relation between toilet training and disobedience and negativism is well known. These children had had experience in developing a negativist attitude toward the things which adults expected of them. This negativism is of potential importance in failure to learn to read.

Timidity was an outstanding characteristic in 13 children. Lack of interest in school was noted in 10. The indications are that the pattern of dependence, timidity and lack of interest has its genesis in the home, and that these children are lacking in the curiosity and emotional drive so essential to reading.

The psychologist submitted the following report as to grades. Four children were in Grade 1, 13 in Grade 2, 7 in Grade 3, and 1 in Grade 4. The average age of the entire group was eight years, corresponding to the third grade, but instead the average was about Grade 2, so that the children were practically one year retarded with respect to chronological age. Furthermore, the group had an average reading grade of only 1.46. In other words, the children did no better in reading than average six-and-a-half-year-old children. Apparently they had stopped learning to read, yet it is certain that lack of intelligence was not the cause. All the children were tested in order to determine hand and eye dominance. The results, as compared with those ascertained in similar and normal groups of children, showed a preponderance of mixed dextrality, that is right-handedness and left-eyedness. In this study we believe that mixed dextrality was not a significant factor. Readers are referred elsewhere<sup>2</sup> for a complete discussion of the relation between handedness and reading.

The averages for the types of error that these children made in reading are shown in Figure 1.

down the arm and the ulnar side of the forearm. The patient became faint and lay down. As he did so he felt a second snap in his neck. Immediately the acute pain in the shoulder subsided. However, rigidity occurred and motion of the head or arm caused pain in the supraclavicular fossa and over the posterior aspect of the shoulder, with some radiating pain down the ulnar side of the left arm and forearm. When the patient lay quietly, however, he had no pain but had some tingling in the fourth and fifth fingers of the left hand. X-ray photographs taken the day after the second attack of pain revealed a fracture of the first rib on the left side, at the point of insertion of the scalenus anticus muscle (Fig 1).

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MILTON E. KIRKPATRICK, M.D.†

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states, "In Grade 1, 99 per cent of the pupils failing promotion were marked as failures in reading, in Grade 2 the percentage was 90, in Grade 3 the percentage was 68." The importance of reading in its relation to school failure cannot be questioned.

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\*Part of a child guidance project conducted in the public schools of Webster, Massachusetts by the staff of the Worcester Child Guidance Clinic.

†Formerly director of Child Guidance Clinic, Worcester State Hospital, Worcester, Massachusetts.



Helen's mother is a cripple, barely able to walk. The child's father, in his sixties, is not well and keeps house. The older children at home baby Helen and read to her, and she likes this very much. The home is not giving her adequate physical care or training, and we believe that it is not surprising that the carelessness apparent in the child's physical appearance should also be evident in her reading habits. It is interesting that the father blames the school for all Helen's difficulties.

**Recommendations** Drill calculated to correct the carelessness which we think is the most significant thing about her reading errors. Anything the school or the teacher can offer this child in the way of training in the amenities and in habits of order, neatness and good workmanship should be of value to her. While it is realized that what the school can do is necessarily limited, it is believed that in this case the school, because of the home situation, is a more important factor than it is in the case of the average child.

**Recommendations for the School Nurse** Helen is badly in need of dental care and has tonsils which are enlarged and should be removed. We think that the Health Department should give serious consideration to having his home supervised, perhaps by a state worker.

These reports were taken to the individual teachers and discussed with them. At the same time the teachers reported on the adjustment and progress of the children. Possibly one of the most valuable by-products of the study is the absolving of the teacher of blame for all the children's failures, with the result that she can attack the problem with added energy. Certainly the improvement that some of these children have

made can be directly attributed to the teacher's changed perspective and fresh efforts.

In conclusion, failure of this group of children to keep pace in reading appears to be a personality problem centering around emotional conflict and lack of maturity. They are the younger children in the family, have been read to by parents and older siblings and have developed dependent and submissive traits. Lack of interest in school indicates a willingness to continue in the dependent role. This may be influenced to some extent by the presence of negativism, which is a carry-over from the child's early training. We are giving an increasing amount of attention to the significance of conflict as an important factor in personality development. If conflict generates a sufficient amount of unhappiness and feeling of difference, it will influence the learning process as well as other aspects of the child's personality development. The reactions of this group are in keeping with our observations on the importance of conflict in similar age groups. Proof is lacking that the failures in learning to read are assignable to any specific cause. On the contrary, we must consider the multiplicity of factors which influence the personality in its attempts at adjustment, whether it be learning to read or some other adjustive processes vital to the individual.

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## REPORT ON MEDICAL PROGRESS

### PHYSIOLOGY\*

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NEW HAVEN, CONNECTICUT

THE past year has been distinguished not only by advances in research and in the application of physiological principles to clinical problems, but also by the appearance of several publications of more than passing interest. The first of these is the new *Annual Review of Physiology*,<sup>1</sup> a worthy companion to the *Annual Review of Biochemistry*. Presenting as it does a broad view of the year's advances in physiology, it is a valuable complement to *Physiological Reviews* which undertakes to give an exhaustive survey of particular fields. The editors have wisely attempted to secure critical appraisal of the assigned topics, rather than a simple catalogue of work done, and

in a large measure they have been successful. The reviews by Bozler on muscle, Davis on electrical phenomena of the brain and cord, Eccles on the spinal cord and reflex action, and Bronk and Brink on bioelectrical studies of the excitation and response of nerve are particularly admirable in this respect, and are especially valuable for the light they throw, from the special viewpoint of their authors, on the common problems of excitation and transmission.

Even more recently has appeared the second edition of the classic *Sex and Internal Secretions*,<sup>2</sup> again under the editorship of Dr. Edgar Allen. Each of the three sections, dealing with the biological basis of sex, the physiology of the sex glands, germ cells and accessory organs and the biochem-

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Ten types of errors were classified pronunciation of vowels (V), pronunciation of consonants (C), reversals (R), addition of sounds (As), omission of sounds (Os), substitutions (S), repetitions (Rp), addition of words (Aw), omission of words (Ow) and words whose pronunciation required aid from the teacher (Wa). The children taken as a whole showed marked difficulty in four directions the pronunciation of vowels and of consonants, the insertion of extra sounds, and the pronunciation of many of the commoner words for which they demanded excessive help, the last-named obstacle was the most outstanding one. Objectively one might conclude that the last group was predominantly a help-seeking one, inclined to rely on others to conquer difficult situations.

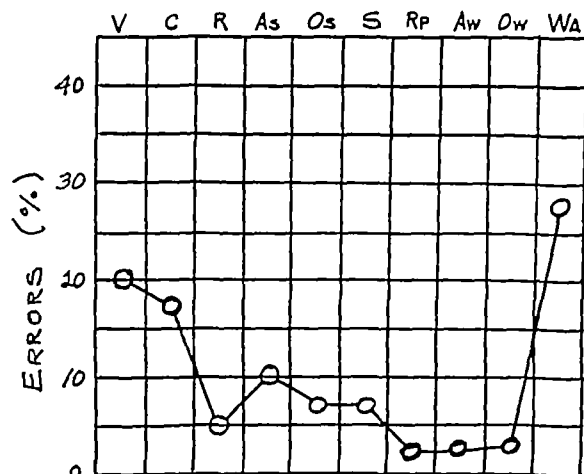


FIGURE 1 Profile of Errors for the Group

All these children were interviewed at least once by the psychiatrist, and 17 were classified as immature. For example, one child would not talk, another put his fingers in his mouth and left them there throughout the interview, answering questions by affirmative and negative movements of the head. Several of the children cried, and others were almost in tears, one stated that he liked to be the baby of the family and did not wish to grow up. Some mental conflict was elicited in 15 children. Three families showed no affection for their children, who felt rejected and unloved. One child was given to relatives. Two children had mothers in mental hospitals, and were not only teased about this by their classmates but believed that they would never see their mothers again. Two children had seen their fathers strike their mothers in a drunken rage. One child was not allowed to play with other children on the street and had no friends. Again it is difficult to say more than that from a psychiatric standpoint these children were essentially unhappy, their minds being preoccupied with conflicts which they could not understand, and

which interfered with their interest in learning. Spending only a few hours each day in the classroom, they were continually subjected to the molding influences of the home, whatever they might be.

The parents were interviewed at the school clinic by social workers, primarily to secure information about background, development, home conditions and attitudes, and with no thought of attempting treatment. Usually the mother was seen, but in several families where the father spoke better English he represented the parents, and in one case both father and mother came to the clinic. When the purpose of the study was explained to the parents, some became interested and asked for suggestions, some were apprehensive, in spite of assurances that no fault on their part or the children's was implied. With other parents, the social worker found herself interpreting some of the child's behavior, or suggesting that fewer comparisons be drawn between him and a precocious younger sibling. It was our opinion that later interviews with the parents might allay any anxiety which might have been aroused, help the relation between parents and school and in some cases modify parental attitudes that might be adversely affecting the child's schoolwork. The parents were promised that in return for their help we would later give them specific suggestions regarding their children.

The parents of all but 3 of the children came for the second interview. Some of them were no clearer about the purpose of the study than they had been in the beginning, and some were fixed in their belief that anything that was wrong was the fault of the school, or because the child had been sickly in infancy. A few had stopped reading so much to their children, or had given them more responsibility, and were pleased with the results, some were planning definitely for a change in their treatment.

After the director had made his general report to all the teachers in the school system, the teachers of the 25 non-readers requested individual reports and recommendations. The clinic staff went over its material, taking from the findings of the psychiatrist, the psychologist and the social worker what might be of practical help to the teacher. An example of such a report is as follows:

HELEN R		
ERRORS IN READING	%	DOMINANCE
Substitutions	25	Right-eyed Right handed
Addition of sounds	15	
Addition of words	14	
Consonants	11	
Vowels	9	
Reversals	9	

been found to be accompanied by changes in the T wave of the electrocardiogram similar to those evoked by increasing the serum potassium in experimental animals by intravenous injection of isotonic potassium chloride solution<sup>36-37</sup> The electrocardiograms of dogs with high serum potassium after adrenalectomy show similar changes<sup>38</sup> The observation that ischemic hearts lose potassium lends some support to the view that the alterations of the electrocardiogram in acute coronary thrombosis may be due in part to alterations in the serum or heart-muscle potassium<sup>39</sup> A high concentration of potassium in solutions perfusing coronary arteries is reported<sup>40</sup> to produce constriction amounting almost to occlusion The suggestion has also been made that changes in nerves and muscles induced by asphyxia may also be due to altered ionic concentrations<sup>41-42</sup>

An important new method for the study of the distribution of ions in the tissue is the use of radioactive isotopes by means of which the course of administered ions may be followed Hamilton<sup>43</sup> has already studied the absorption of radioactive sodium, potassium, chlorine, bromine and iodine in man and Brooks<sup>44</sup> has followed the accumulation of potassium in Valonia by this method It has also been found<sup>45-46</sup> that the radioactive salts behave in the body like the non-active material, thus disproving the old hypothesis of Zwaardemaak that the physiologic properties of potassium are due to its natural radioactivity

#### THE CIRCULATION

The fundamental observations of Goldblatt have established firmly the fact that permanent hypertension may be provoked by limitation of the renal circulation to a degree insufficient to produce local necrosis Sympathectomy does not relieve the excessive blood pressure<sup>47</sup> The evidence seems conclusive that a humoral mechanism is responsible for the elevated blood pressure,<sup>48-50</sup> and investigators have found pressor substances in normal kidneys, and in greater amounts in ischemic kidneys<sup>51-55</sup> The failure of permanent hypertension to develop when one kidney only is rendered ischemic and the onset of permanent hypertension when the normal kidney is later removed suggest strongly that a normal kidney can remove or inactivate the material responsible for the hypertension<sup>57</sup> Increasing the blood supply to the ischemic kidney by establishment of collateral circulation with the omentum has been reported to cure experimental hypertension<sup>58</sup> Reviews by Goldblatt<sup>59</sup> and Graybiel and White<sup>60</sup> are particularly valuable

Recent studies suggest that it is unlikely that the adrenal cortex is involved specifically in the

etiology of experimental hypertension, other than in the sense that the cortex is important in the maintenance of blood pressure in normal as well as in hypertensive states<sup>61-62</sup>

Viewed in the light of the enormous importance of adequate renal circulation, great interest attaches to the recent studies of the renal excretion in man of foreign substances such as inulin and Diodrast Smith and his co-workers<sup>63-64</sup> have shown that in the normal human being these substances are excreted by the kidneys in amounts to require a blood flow through the kidney of nearly 1500 cc of blood per minute (1050 to 1680 cc per minute in thirty-four observations on 15 subjects) Additional evidence indicates that this does not represent a maximum, but that vasodilating procedures may increase and vasoconstricting procedures may decrease these normal figures<sup>63-64</sup> Stated in terms of the figures usually given for cardiac output at rest, it means that from a third to a fourth of the blood ejected by the heart passes through the kidneys

There are various other experimental procedures which may evoke hypertension in animals Many of these are reviewed in the Dunham Lectures by Heymans<sup>65-67</sup> An important contribution to an allied subject, the hypotension of wound shock, is that of Freeman and his associates,<sup>70</sup> calling attention to the role of the sympathetic nervous system in precipitating the shock syndrome

Early observations by Bayliss<sup>71-73</sup> showed that stimulation of the dorsal roots produced a vasodilatation in the skin area supplied by the root stimulated He explained the phenomenon on the basis of a dichotomy of the afferent fibers in the skin, one branch going to a sense organ and the other to a blood vessel Normally this provided the anatomical basis for an "axon reflex" The sense organ being stimulated, impulses are sent along the fiber toward the spinal cord, when they reach the point where the axon collateral occurs they also travel down it to the blood vessel, which they cause to dilate This mechanism was later identified in the "triple response" by Sir Thomas Lewis, who found that the "flare" was mediated by such axon reflexes

Bayliss interpreted his own observations by suggesting that when he stimulated the dorsal roots, impulses traveled down the afferent fibers of the dorsal roots in the opposite direction to their normal course, that is antidromically Impulses thus eventually reached the axon collateral and produced dilatation Since that time a great number of investigators have been dissatisfied with this explanation, and have sought to detect in the dorsal roots true efferent fibers with cell stations

istry and assay of gonadal hormones, is worthy of a separate volume, and if the importance of each subject increases in the future as it has in the past, the sections will no doubt demand separate publication in future editions. As in the *Annual Review of Physiology*, the usefulness of the book depends on the evaluation of work rather than on the mere compilation of titles, and there is more than a suggestion that in both volumes, with certain notable exceptions, the value of individual chapters is inversely proportional to the length of the bibliography.

Among the more specialized monographs, Stevens and Davis's<sup>3</sup> *Hearing: Its psychology and physiology* and Fulton's<sup>4</sup> *Physiology of the Nervous System* deserve mention. The first is the result of a fruitful collaboration between a psychologist and a physiologist, and effectively bridges the gap which often separates these fields. The book is remarkable for its emancipation from classical theorizations and for the ability of the authors to synthesize the material gained from study of small units and isolated phenomena into a unified account. The second is a welcome addition to the series "Outlines of Physiology," published by the Oxford University Press. This book presents a reasoned account of the functions of the cord and brain stem, it is historically well oriented, gives a judicious evaluation of the huge mass of modern work and is based primarily on the author's own investigations and collaborations in a wide variety of problems presented by the central nervous system.

#### THE ROLE OF IONS IN PHYSIOLOGIC PROCESSES

The past few years have seen an intensification of interest in the function of ions in a variety of physiologic processes, this is particularly true of the potassium ion. The studies of Ringer<sup>5</sup> long ago emphasized the importance of this ion in maintaining normal cardiac contractility and automaticity, and the influence of preponderance or deficiency of other ions. Howell<sup>7</sup> called attention to changes in potassium during vagal inhibition of the heart, determined the influence of low and high potassium on the action of the vagus on the heart and concluded that the vagus may inhibit that organ by changing the concentration of potassium. As long ago as 1900, Macdonald<sup>8</sup> suggested that the action current in nerves was caused by a difference in the concentration of potassium ions inside and outside the nerve membrane, and the recent work of Osterhout and his collaborators<sup>9</sup> and of Cowan<sup>10</sup> has supported this view. An influence of calcium and potassium on the recovery process in nerve, as shown by its effect on the afterpotentials, has also been demonstrated.<sup>11-12</sup> Potassium is also clearly implicated in neuromuscular trans-

mission and in muscular contraction. Its anticholinergic-like action has been noted by several investigators,<sup>13-14</sup> and Brown and von Euler<sup>15</sup> have suggested that liberation of potassium ions is responsible for the phenomenon of post-tetanic potentiation, which is characterized in part by the facilitation of neuromuscular conduction by a tetanus. Bronk and others<sup>16-19</sup> have demonstrated that potassium has a similar facilitating influence on ganglionic transmission. Largely through the work of Fenn,<sup>20</sup> it is now well known that muscle loses potassium during contraction and regains it during rest. Wilson and Wright<sup>13</sup> have shown that intra-arterial injection of potassium salts increases the vigor of contraction in normal and denervated muscles, and Brown<sup>21</sup> has shown that in sufficient concentration they evoke tetanic discharge in the muscle. Wilder and his colleagues<sup>22</sup> have called attention to the importance of potassium in adrenal insufficiency, and have shown that an increased intake of potassium precipitates attacks. Serum potassium may or may not be elevated in Addison's disease, but is markedly elevated in experimental insufficiency. In such conditions of adrenal insufficiency the concentration of intramuscular potassium is found to increase markedly, while liver potassium fails to show any increase. Harrison and Darrow<sup>23-24</sup> have shown that the cure of adrenal insufficiency by the injection of the adrenocortical hormone or by administration of sodium chloride and sodium bicarbonate in hypertonic solutions is followed by return to normal of the intramuscular potassium. This action may be related to a direct effect of the hormone on the potassium metabolism within the muscle, or to alterations in the renal excretion of potassium during adrenocortical insufficiency. It is now well established that familial periodic paralysis is associated with low serum potassium during attacks. Ingestion of potassium, according to Aitken and others,<sup>25-29</sup> relieves and prevents attacks, while measures which lower serum potassium, such as the administration of insulin and glucose, produce attacks of paralysis. The function of potassium in the muscle may also be associated with carbohydrate metabolism. Injection of potassium has been found by Silvette, Britton and Kline<sup>30-31</sup> to produce a marked rise in blood sugar at the expense of liver and muscle glycogen. Kendall<sup>32</sup> reports that when cortical extract is given to a rat with high blood sugar resulting from partial pancreatectomy, a marked excretion of potassium takes place, while the administration of potassium greatly increases the glycosuria. The drop in serum potassium following insulin injections in man and animals has been recognized for some time.<sup>33-35</sup>

Only recently the increased level of serum potassium in Addison's disease and in nephritis has

the Harvard physiologists of the term "adrenine" in favor of "adrenaline". The very sound reasons for using "adrenine" and the great authority of the Harvard school were never able to dislodge 'adrenaline' from public favor, nor has the campaign in favor of "epinephrine" been any more successful. In taking this step Dr Cannon has done much to encourage simplification of physiological nomenclature.

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within the spinal cord which might mediate reflex vasodilatation. A great mass of material, reviewed some time ago by Sheehan,<sup>74</sup> yielded entirely in conclusive evidence. This year, however, Toenies,<sup>75</sup> working in Gasser's laboratory, obtained evidence of what seemed to be true reflex discharge emerging from the spinal cord via the dorsal roots. A stimulus being delivered to a group of afferent fibers discharges appeared in the dorsal roots after a period of latency comparable with that of other spinal reflexes. The classical characteristics of reflex discharge could be demonstrated: central latency, facilitation, after-discharge, and so forth. Most conclusive was the demonstration that impulses could be recorded in fibers other than those in which the afferent impulses traveled to the cord, on the same or opposite sides of it.

These remarkable experiments, which seemingly overthrow the classic doctrine of Bell and Magendie, which postulates that efferent or motor discharge occurs only via ventral root fibers, while afferent impulses enter only along dorsal root fibers, are too recent to have been thoroughly discussed by other workers. Preliminary accounts have only recently appeared describing certain differences in modifying conditions.<sup>76-77</sup> It appears that a subnormal temperature is required to obtain these reflexes, and that at body temperature they may not be found. The suggestion has been made that they are largely artefacts, in the sense that they represent the stimulation of the dorsal-root nerve endings rendered abnormally sensitive by cold, through the negative cord potentials known to exist following afferent stimulation and apparently responsible for the normal reflex activity following such stimulation. It seems to be a matter of some doubt, therefore, whether these reflexes can represent the functioning of the postulated "dorsal root efferents" in vasodilator reflexes, on the other hand, it is equally probable that study of these effects will shed a great deal of light on the normal physiology of reflex activity in the cord.

Some other evidence also suggests that the dorsal roots are not involved in reflex vasodilatation,<sup>78</sup> but the axon reflex has been further implicated in local vasodilating mechanisms. It is probably responsible for the reactive hyperemia in response to cold. Wybauw<sup>79</sup> has presented evidence of its activity not only in skin but also in muscle, where it may play a part in the spread of vasodilatation in the actively contracting muscle.

#### HORMONES

Much evidence has accumulated on the subject of the role of the autonomic nervous system in the genesis of ulceration in the gastrointestinal

tract. Many authors have claimed that lesions of the hypothalamus may produce ulcers, while others have been unable to confirm this. It is certainly true that not every hypothalamic lesion is followed by an ulcer, but on the whole the incidence of ulceration following such lesions is higher than in non-operated animals, or in those in which lesions of other regions of the brain have been produced. Since such hypothalamic lesions, at least theoretically, produce changes in the local secretion of sympathin or acetylcholine, attempts have been made to induce ulcers by the administration of these substances. Necheles<sup>80-81</sup> has now reported success using acetylcholine. Hemorrhagic ulcers were produced in all parts of the gastrointestinal tract in dogs by injections of this drug. Further implication of acetylcholine in the production of pathologic changes is claimed by Hall,<sup>8</sup> who has induced arteriosclerotic-like changes in the coronary arteries of dogs by repeated injections of this hormone.

What value these observations may have in regard to the genesis of ulcers and coronary disease in man is of course problematical. They serve, however, to bring again to the attention of physicians the importance of persistent imbalance of autonomic activity from reflex or psychic causes. It has been known for three quarters of a century that pronounced vagal reflexes affecting especially the heart may be obtained by irritation of the nasopharynx by vapors of ether, chloroform, ammonia, and so forth.<sup>82</sup> It is possible that irritation from tobacco smoke may also evoke these reflexes in susceptible subjects, and thus lead to excessive liberation of acetylcholine in the heart and gastrointestinal tract, where it may in time produce pathologic changes.<sup>84</sup>

Fisher, Ingram and Ranson<sup>83</sup> have recently summarized their studies of the nervous control of the secretion of the antidiuretic hormone. The hypophyseal hormone responsible for the prevention of diabetes insipidus is secreted by the pars nervosa, the median eminence and the infundibular stem. The secreting cells are themselves subject to nervous control from the supraoptic nuclei via the supraoptic hypophyseal tract, and an intact nervous mechanism is necessary for normal water metabolism. The presence of an intact anterior pituitary is necessary for the establishment of diabetes insipidus, or at least greatly facilitates its appearance, especially in the dog and cat. In the rat, presence of the anterior pituitary does not appear to be essential.

A definite spirit of progress is exhibited in a short explanatory note in a paper by Cannon and Lisak<sup>86</sup> entitled "Evidence for Adrenaline in Adrenergic Neurons." It marked the abandonment by

### *Medical Education and Medical Diplomas*

Dr Reginald Fitz, Suffolk, presented the report (Appendix No 6), which was accepted by vote of the Council

### *State and National Legislation*

An informal report was presented by Dr Charles C Lund, Suffolk. He pointed out the need for constant vigilance in legislative matters and suggested the necessity of presenting a positive program. Certain nuisance bills can simply be opposed and defeated but, in the case of certain definite trends of public feeling, it is necessary for organized medicine to propose definite constructive legislation. If unfavorable bills along similar lines are to be successfully opposed, in his opinion the responsibility for the protection of the public in medical matters rests with the medical profession. He called attention to the legislative bulletin, copies of which had been distributed at the meeting.

He pointed out that the committee had been successful in defeating all the bills which it had opposed, with the exception of three which have not yet been disposed of. The same success was not obtained with the bills which the committee favored. Three relatively minor measures were passed and the bills signed by the Governor. One of these, proposed by Dr Edward A Knowlton, Hampden, has removed the restriction previously imposed relative to membership in this society by appointees to the Board of Registration in Medicine.

The bills for annual registration of physicians and the licensing of hospitals were defeated. The bill to make changes in the Nurses' Registration Act has not been acted on, and the outcome is by no means certain since serious objections have been raised to many of its provisions.

It was reported that the Committee on State and National Legislation, in co-operation with the Committee on Public Relations, acting under the instructions of the Council passed at the meeting of April 26, has submitted a bill to authorize the formation of a non-profit corporation to insure payments of physicians' bills. The proposed bill must first be passed by the rules committees of the Legislature and, if allowed by these committees, it will be scheduled for regular hearings and action in the usual way.

Dr Lund then proceeded to discuss the action taken by the committee with reference to the Wagner Bill now before Congress. The chairman had been in communication with Senators Lodge and Walsh and was informed that the congressional

sional subcommitteemen would hold hearings on certain dates in May. Senator Lodge advised that a representative of the Society should be present. Dr Woodward, of the American Medical Association, gave similar advice. The chairman appeared before the subcommittee on May 26, 1939, after a series of conferences with representatives of the American Medical Association and with Senators Lodge and Walsh. His presentation to the committee differed somewhat from the arguments of the American Medical Association and at the end of the hearing the committee asked the Massachusetts Medical Society to assist in writing the proper kind of bill. The committee made a similar request to the American Medical Association.

He then proceeded to read a series of resolutions and referred to a statement by him which appeared in the *New England Journal of Medicine* for June 1, 1939, under "Legislative Notes."

The Council voted to accept the report as presented by the chairman. It then voted to approve the following resolutions:

RESOLVED, That the President nominate and the Council of the Massachusetts Medical Society elect a special committee to study and to have corrected, so far as possible, the practice of medicine by unregistered persons.

RESOLVED, That the Council of the Massachusetts Medical Society endorse the statement made by Dr Charles C Lund before the subcommittee of the United States Senate that is studying the Wagner Bill.

There was considerable discussion before the passage of the second resolution, part of which sought to delay action by the Council at this time and part of which was an explanation of the changes made in Dr Lund's presentation between the time it was read to the Committee on State and National Legislation and the Committee on Public Relations in joint session and the final form in which it was read to the senatorial committee.

The Council then considered a third resolution submitted by Dr Lund, which was as follows:

RESOLVED, That the Council of the Massachusetts Medical Society urge the Trustees and the House of Delegates of the American Medical Association to prepare a bill or bills and have them introduced into Congress for the following purpose: to correct so far as medically and socially sound and possible of legislative correction the evils that the American Medical Association admits exist and which the proponents of the Wagner Bill have hoped to correct by their bill.

There appeared to be a feeling on the part of some councilors that action on this resolution should be postponed until a subsequent meeting of the Council so as to permit further discussion and

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## MASSACHUSETTS MEDICAL SOCIETY

### PROCEEDINGS OF THE COUNCIL

Annual Meeting, June 7, 1939

THE annual meeting of the Council of the Massachusetts Medical Society was held in the Municipal Memorial Auditorium, Worcester, on Wednesday, June 7. The President, Dr Channing Frothingham, Suffolk, called the meeting to order at 10 30 o'clock. There were 219 councilors in attendance (Appendix No 1).

The Secretary presented the record of the special meeting of the Council which was held in John Ware Hall, 8 Fenway, Boston, on Wednesday, April 26, 1939, as published in the *New England Journal of Medicine* for May 25, 1939. The record was declared approved.

One councilor having died since the last meeting, the President read the following obituary:

ALBERT F. LOWELL, M.D., of Gardner, died May 14, 1939, in his sixty-fifth year.

Born in Burlington, Vermont, Dr Lowell received his degree from the University of Vermont College of Medicine in 1900 and had practiced in Gardner since 1901.

Dr Lowell had been senior surgeon of the Henry Heywood Memorial Hospital and consulting surgeon at the State Hospital for the Insane at East Gardner, the Templeton Branch of the Walter E. Fernald School and the Peterboro (New Hampshire) Hospital.

His fellowships included the American Medical Association and the American College of Surgeons. He was a member of the Council of the Massachusetts Medical Society from June, 1923, until his death.

He is survived by his widow and one daughter.

The Council stood for a period of silence in respect to the memory of Dr Lowell.

A roll call showed the following nominating councilors to be present: W. D. Kinney, Barnstable; W. H. Allen, Bristol North; E. F. Cody, Bristol South; F. W. Snow, Essex North; J. F. Jordan (alternate), Essex South; G. L. Schadt, Hampden; L. N. Durgin, Hampshire; R. R. Stratton, Middlesex East; C. M. Roughan, Middlesex North; A. W. Dudley, Middlesex South; W. A. Griffin, Norfolk;

C. A. Sullivan, Norfolk South; W. H. Pulsifer, Plymouth; W. B. Breed, Suffolk; R. P. Watkins, Worcester; and C. B. Gay, Worcester North. (There were no representatives from the Berkshire and Franklin districts.) The nominating councilors retired to the Green Room for deliberation.

#### REPORTS OF STANDING COMMITTEES

##### Membership

The report (Appendix No 2), which was presented by the chairman, Dr H. Quimby Gallupe, Middlesex South, recommended that eleven fellows be allowed to retire, five allowed to have their dues remitted, four allowed to resign, three be deprived of the privileges of fellowship, four be restored to the privileges of fellowship, and four be allowed to change their districts without change of legal residence. The report was accepted by vote of the Council.

##### Financial Planning and Budget

The report (Appendix No 3) was presented by the chairman, Dr John Homans, Suffolk, and was duly accepted. The Council voted to approve the committee's recommendation that the annual salary of Mr Robert St. B. Boyd be placed at \$2500 per year.

##### Arrangements

Dr Richard P. Stetson, Norfolk, chairman, presented the report (Appendix No 4) of the committee, which was duly accepted by the Council.

##### Ethics and Discipline

The report (Appendix No 5) was presented by the chairman, Dr Robert L. DeNormandie, Suffolk, and was accepted by vote of the Council.



National Legislation, the President nominated Drs Charles C Lund, Earle M Chapman, Charles A Robinson, William A R Chapin and John A McLean Dr Roger I Lee, Suffolk, moved the nomination of Drs Brainard F Conley and David L Lionberger There being seven nominations, ballots were issued, and the President appointed Drs Lee, Homans, Shattuck and Blaisdell as tellers The names of the nominees were written on the blackboard for consideration by the Council After some discussion as to procedure, it was finally voted that the five men receiving the highest vote would be considered elected It was voted that nominations cease, and the Council proceeded to ballot The tellers retired to count the vote

In connection with the retirement of Dr Franklin G Balch, Norfolk, as chairman of the Committee on Medical Defense and of Dr Robert B Osgood, Suffolk, as chairman of the Committee on Public Health, the Council voted to extend its thanks and appreciation to these gentlemen for their faithful services

It was voted that the incoming president should nominate a fifth member of the Committee on Financial Planning and Budget since he is now a member of that committee and his election as president makes him a member ex-officio, thus creating a vacancy

#### PROPOSED CHANGES IN THE BY-LAWS

The Council voted to approve certain amendments to the by-laws and to recommend their adoption by the Society at its annual meeting on June 8 (The complete text of these amendments will appear with the proceedings of the Society in the July 6 issue of the *Journal*)

In the discussion of the individual amendments, the Council voted to transpose one sentence in Amendment No 3 so as to avoid ambiguity The Council voted not to approve of the proposed amendments which would change the time of appointment of the standing committees from June to October There was some discussion about the length of time which fellows serve on committees It was pointed out that the Committee of Arrangements has one new member appointed each year and the senior member retires Dr Fitz stated that the Committee on Medical Education and Medical Diplomas is of the opinion that rotation is desirable

#### INCIDENTAL BUSINESS

The appointment of twenty-five fellows to serve as voting members in the Associated Hospital Service Corporation of Massachusetts was confirmed by the Council. (The complete list will

appear as a part of the proceedings of the Society in the issue of July 6)

The Council voted to confirm the appointments of three delegates and one alternate to the Convention for the Revision of the *Pharmacopoeia of the United States*, which will meet in Washington, District of Columbia, on May 14, 1940, as follows

#### DELEGATES

Soma Weiss, Boston  
James H. Means, Boston  
Harold J Jeghers, Brighton

#### ALTERNATE

William B Castle, Boston

The President presented a letter from the Bureau of Legal Medicine and Legislation of the American Medical Association asking the Massachusetts Medical Society, at its annual session in Worcester, to voice a strong demand for an appropriation for the construction of a new building for the Army Medical Library and Museum in Washington, District of Columbia, and to appoint a committee to follow this matter through until an appropriation has been made

Dr Shields Warren, Suffolk, discussed the importance of the suggestion made and emphasized the need of new quarters for the Army Medical Museum and Library since the collections contained therein are of such value to all types of medical research He moved that the Council take the action requested The motion was duly passed

Dr Robert L DeNormandie, Suffolk, presented a communication (Appendix No 12) from the Advisory Committee of the Section of Obstetrics and Gynecology On motion of Dr DeNormandie, it was voted that the President appoint a committee of five to study the question of expert testimony in court cases and that it be empowered to confer with the Massachusetts Bar Association with the hope that rules and regulations may be drawn up in order to improve the situation

Dr John M Fallon, Worcester, read a statement (Appendix No 13) concerning the progress which is being made in the negotiations between hospital authorities and certain groups of specialists in the medical profession

Dr Henry M Landesman, Norfolk, presented a communication to the Secretary enclosing a proposal for the organization of an insurance plan The chair announced that this would be referred to the Committee on Public Relations for study

The Council recessed for the Coting Luncheon from 1.20 to 2.30 p m On resuming the session the President announced that the only remaining item of business was to receive the report of the tellers appointed to count the ballots for the nomination of members to the Committee on State and National Legislation

consultation with the American Medical Association

An amendment was proposed by Dr Michael A Tighe, Middlesex North, which would refer the whole matter of the Wagner Bill to a special committee which would report at the February meeting of the Council and that subsequently the findings would be referred to the House of Delegates of the American Medical Association Dr Lund pointed out the danger of delay and quoted from a telegram received by him from Senator Lodge Dr Tighe's amendment was put to vote and was lost

Dr Lund's original resolution was then presented and was approved by the Council

### *Public Health*

The report (Appendix No 7) of the committee, prepared by the chairman, Dr Robert B Osgood, Suffolk, was presented by Dr Francis P Denny, Norfolk The report was accepted After some discussion of a proposal that the Massachusetts Medical Society assist in conducting medical examinations of young people under the National Youth Administration, the Council voted to decline the invitation

### *Others*

There were no reports from the Committee on Publications, the Committee on Medical Defense and the Committee on Permanent Home

### REPORTS OF SPECIAL COMMITTEES

#### *Cancer*

There was no report from this committee

#### *Postgraduate Instruction*

The report (Appendix No 8) was presented by Dr Reginald Fitz, Suffolk It was accepted, and the Council voted to approve the recommendation that the Committee on Postgraduate Instruction be continued

#### *Physical Therapy*

Dr Franklin P Lowry, Middlesex South, presented the report (Appendix No 9) of this committee, which was accepted by vote of the Council

#### *Public Relations*

Dr Elmer S Bagnall, Essex North, stated that the report made by Dr Lund concerning the proposed legislation to insure payment of physicians' bills and his report on the Wagner Bill covered the activities of the Committee on Public Relations since its previous report

### *Industrial Health*

The President stated that this was a new committee appointed at the request of the American Medical Association No report was presented

### *Relations Between Physicians, Hospitals and Insurance Companies*

In the absence of the chairman, Dr William G Curtis, Norfolk South, Dr Henry M Landesman, Norfolk, the secretary, informally reported that four cases had been adjusted for physicians during the past year and that two others are in process Apparently all parties concerned are satisfied with the workings of the agreement He stated that the insurance companies are of the opinion that many physicians have not yet taken advantage of the authorization forms and consequently fail to obtain protection of their accounts in accident work The report was accepted

### *Restoration to Fellowship*

The Council voted to approve of the reports of committees recommending restoration to the privileges of fellowship of seven applicants and to accept the report of a committee which did not recommend restoration of one (Appendix No 10)

The Council voted to appoint committees to consider petitions for restoration to fellowship received from six individuals (Appendix No 11)

### REPORT OF NOMINATING COMMITTEE

Dr Edmond F Cody, Bristol South, presented the report of the Nominating Committee which recommended election to office for the ensuing year of the following

For president Walter G Phippen, Salem  
For vice president A Warren Stearns, Billerica  
For secretary Alexander S Begg, West Roxbury  
For treasurer Charles S Butler, Boston  
For orator W Jason Mixer, Boston

There being no nominations from the floor, it was voted that the nominations cease and that the Secretary be instructed to cast one ballot for the individuals named by the Nominating Committee. The Secretary reported that the ballot had been cast and the President declared the gentlemen named to be duly elected

### APPOINTMENTS OF COMMITTEES

The President proceeded to nominate and the Council to elect the members of the standing and special committees (The list will be published with the proceedings of the Society in the July 6 issue of the *Journal*)

As members of the Committee on State and

W P Bowers	W C Seelve
L R Bragg	C A Sparrow
W A Bryan	G C Tully
P H Cook	R J Ward
W J Delahanty	F H Washburn
G A Dix	R P Watkins
E B Emerson	S B Woodward
G E Emery	WORCESTER NORTH
J M Fallon	E A Adams
E L Hunt	W E Currier
E R Leib	T R Donovan
W F Lynch	C B Gay
A W Marsh	J C Hales
J W O Connor	H R Nye

## APPENDIX NO 2

## REPORT OF THE COMMITTEE ON MEMBERSHIP

This committee recommends

1 That the following named eleven fellows be allowed to retire under the provisions of Chapter I, Section 5, of the by laws

Ahearn, Cornelius A, Jr, Salem, with remission of dues for 1939  
 Brunelle, Pierre, Lowell  
 Cragin, George A, Boston  
 Cusick, Thomas F, Taunton, with remission of dues for 1936, 1937, 1938 and 1939  
 Davis, Minot F, Boston, with remission of dues for 1936, 1937, 1938 and 1939  
 Galvin, William, North Adams, with remission of dues for 1939  
 Howard, Charles T, Boston, with remission of dues for 1936, 1937, 1938 and 1939  
 Milliken, Charles W, Fairhaven, with remission of dues for 1939  
 Sullivan, John T, Dorchester, with remission of dues for 1939  
 Wilcox, DeWitt G, Newton Centre  
 Young, Roy D, Arlington, with remission of dues for 1936, 1937, 1938 and 1939

2 That the dues of the following named five fellows be remitted under the provisions of Chapter I, Section 6, of the by laws

Borden, Charles R. C, Brookline, 1939  
 Dunscombe, William C, Porto Rico, 1939  
 Hamilton, Robert D, Newburyport, 1939  
 Plouffe, Bernard L, Webster, 1938 and 1939  
 Wilder, Edward W, South India, 1939

3 That the following named three fellows be allowed to resign under the provisions of Chapter I, Section 7, of the by laws

MacMillan, Andrew Louis, Jr, Concord, New Hampshire, with remission of dues for 1939  
 McLean, Emory A., Portland, Maine, with remission of dues for 1939  
 Pagliuca, Frank A., Boston, with remission of dues for 1937, 1938 and 1939

4 That the following named fellow be allowed to resign under the provisions of Chapter VII, Section 4, of the by laws

Pearlstein, Max, Braintree

5 That the following named three fellows be deprived of the privileges of fellowship under the provisions of Chapter I, Section 8, Clause a of the by-laws

Annis, Sumner B, Maynard  
 Karlsberg, Irving J, Hudson  
 Lyle, Eveline B, Brookline

6 That the following named four fellows be restored to the privileges of fellowship

Costa, Domizio A, Revere  
 Mahony, Francis R., Lowell  
 McCarthy, Humphrey L, Boston  
 Rushmore, Stephen, Newton Centre

7 That the following named four fellows be allowed to change their membership from one district society to another without change of legal residence, under the provisions of Chapter III, Section 3, of the by-laws

From Middlesex South to Suffolk

Burrage, Walter S, Newton

From Norfolk to Suffolk

Beaman, George B, Jr, Wellesley Hills  
 Hoyt, Lyman H., Brookline  
 Woodall, J Martin, Jamaica Plain

## APPENDIX NO 3

## REPORT OF THE COMMITTEE ON FINANCIAL PLANNING AND BUDGET

The Committee on Financial Planning and Budget makes the following recommendations to the Council

1 In the matter of an honorarium for the orator of the Society at the annual meeting, referred to the Committee on Financial Planning and Budget by the Council the committee recommends that it is not advisable to offer the orator of the Society an honorarium on account of his oration at the annual meeting

2. The committee recommends to the Council that the annual salary of Mr Robert St. B Boyd, originally \$2000 be raised during the present year to \$2500, that is, to \$500 more than was appropriated at the February meeting of the Council

JOHN HOMANS, *Chairman*

## APPENDIX NO 4

## REPORT OF THE COMMITTEE OF ARRANGEMENTS

The Committee of Arrangements takes this opportunity to present before the Council the tremendous importance of the work of Mr Robert Boyd in the planning and execution of the activities associated with the annual meeting. His energy, meticulous attention to detail and cheerful and diplomatic dealings with the many individuals and groups concerned with the annual meeting make his services to the Society of inestimable value.

It is of material interest to report that the revenue from commercial exhibits at the Worcester meeting in 1934 was approximately two thousand dollars, whereas it will probably be more than forty-eight hundred dollars this year.

The Committee of Arrangements takes pleasure in expressing to Dr Charles A. Sparrow and to his associates on the Worcester Committee for the Annual Meeting its

Dr Homans announced that the following fellows had been chosen

Charles C Lund  
Earle M Chapman  
David L Lionberger  
Charles A Robinson  
Brainard F Conley

The President then announced that he nominated Dr Charles C Lund as chairman of the committee. There being no other nominations, the Council voted to approve of Dr Lund's appointment as chairman.

The meeting adjourned at 2 35 p m

ALEXANDER S BEGG, *Secretary*

# APPENDIX NO 1

## ATTENDANCE

### BARNSTABLE

M E Champion  
W D Kinney

### BERKSHIRE

J J Boland  
I S F Dodd  
C F Fasce  
John Hughes  
C F Kernan

### BRISTOL NORTH

R. M. Chambers  
W H Allen  
F H Dunbar  
W H Swift

### BRISTOL SOUTH

Thomas Almy  
R. B. Butler  
E F Cody  
J A Fournier  
E D Gardner  
I N Tilden

### ESSEX NORTH

H F Dearborn  
E S Bagnall  
C S Benson  
E. H. Ganley  
H R. Kurth  
P J Look  
G L. Richardson  
F W Snow  
L. T. Stokes  
C A. Weiss

### ESSEX SOUTH

H A Boyle  
J F Donaldson  
R. E Foss  
S E Golden  
J F Jordan

### FRANKLIN

F J Barnard  
W J Pelletier  
H. G. Stetson

### HAMPDEN

Frederic Hagler  
T S Bacon  
E P Bagg  
W C Barnes  
J M. Birnie  
W A R. Chapin  
J L. Chereskin  
E. C. Dubois  
G L. Gabler  
M F. Gaynor  
P E Gear  
G D. Henderson  
E. A. Knowlton  
M. W. Pearson  
A G Rice  
G L. Schadt  
H L. Smith  
G L. Steele

### HAMPSHIRE

A J. Bonneville  
J D. Collins  
L. N. Durgin

### MIDDLESEX EAST

J H. Blaisdell  
Richard Dutton  
E M. Halligan  
J H. Kerrigan  
K L. MacLachlan  
R. W. Sheehy  
R. R. Stratton

### MIDDLESEX NORTH

F L. Gage  
A R. Gardner  
E. A. Payne

C M Roughan  
A W Stearns  
M A Tighe

### MIDDLESEX SOUTH

E W Barron  
Harris Bass  
E. H. Bigelow  
G F H Bowers  
E J Butler  
B F Conley  
C L Derick  
J E Dodd  
D C Dow  
A W Dudley  
H Q Gallupe  
F W Gay  
H G Giddings  
H W Godfrey  
W G Grandison  
A D Guthrie  
A M Jackson  
A. A. Levi  
F P Lowry  
R. A. McCarty  
J A. McLean  
Edward Mellus  
J C Merriam  
C E Mongan  
J P Nelligan  
E J O'Brien, Jr  
W D Reid  
Max Ritvo  
E S A Robinson  
E. F. Ryan  
E. J. Sawyer  
W N Secord  
E F Sewall  
H P Stevens  
H W Thayer  
Fresenius Van Nüys  
R. H. Wells  
M. W. White  
W S Whittemore

### NORFOLK

C J Kickham  
J D Adams  
F J Bailey  
F G Balch  
J R. Barry  
A. S. Begg  
M I Berman  
G F Blood  
Myrtelle M. Canavan  
William Dameshek  
G L. Doherty  
Albert Ehrensried  
D G Eldridge  
C B Faunce, Jr  
J C V Fisher  
Eli Friedman  
Maurice Gerstein  
W A. Griffin  
J B Hall  
I R. Jankelson  
C J E. Kickham  
E. L. Kickham

H M. Landesman  
W A. Lane  
D L. Lionberger  
F P McCarthy  
M W O Connell  
Frederick Reis  
D D Scannell  
J W Spellman  
R P Stetson  
H F R. Watts

### NORFOLK SOUTH

D B Reardon  
C S Adams  
R. L. Cook  
W G Curtis  
N R. Pillsbury  
W L. Sargent  
C A Sullivan

### PLYMOUTH

J E Brady  
Jacob Brenner  
H A Chase  
A L. Duncombe  
P B Kelly  
P H Leavitt  
D W Pope  
W H Pulsifer  
H C Reed

### SUFFOLK

Reginald Fitz  
W B Breed  
W J Brickley  
C S Butler  
E M Chapman  
David Cheever  
M. H. Clifford  
H M Clute  
Lincoln Davis  
R. L. DeNormandie  
N W Faxon  
G B Fenwick  
A. McK. Fraser  
Channing Frothingham  
M. N. Fulton  
Joseph Garland  
John Homans  
A A Hornor  
Rudolph Jacoby  
E. P. Joslin  
H A Kelly  
T H Lanman  
R. I. Lee  
C C Lund  
J P Monks  
R. N. Nye  
L. E. Phaneuf  
Helen S Pittman  
W H. Robey  
G C Shattuck  
R. M. Smith  
S N Vose  
Shields Warren  
Conrad Wesselhoeft

### WORCESTER

J C. Austin  
Gordon Berry

During the past year the committee has watched with interest the progress of the Society's efforts at postgraduate education. The program has created favorable discussion in other parts of the country and, on the whole, has proved successful. This year the Suffolk District Medical Society tried a new experiment. Each doctor licensed to practice and having an office in Suffolk County was invited to attend the course of lectures and those who expressed the desire were sent each week a postcard stating the subject of the week's lecture, the lecturer, and the time and place at which the lecture would be given. In this manner many doctors not hitherto approached by the Society were given opportunity and stimulus to receive systematic postgraduate instruction. Nearly two hundred attended the more popular sessions.

Another new effort in education sponsored by the Society in the past year was the Postgraduate Assembly. This proved unexpectedly popular and no doubt will be come increasingly so as time goes on. The Society is to be congratulated on having initiated so useful an undertaking.

EDWARD S. CALDERWOOD  
ARCHIBALD R. GARDNER  
GEORGE D. HENDERSON  
A. WARREN STEARNS,  
REGINALD FITZ, *Chairman*

## APPENDIX NO. 7

### REPORT OF THE COMMITTEE ON PUBLIC HEALTH AND THE SUBCOMMITTEE ON PUBLIC EDUCATION

The Committee on Public Health and the Subcommittee on Public Education beg leave to submit the following report.

The radio broadcasts under the auspices of the Massachusetts Department of Public Health and the Massachusetts Medical Society will continue each week into July. It is unfortunate that, owing chiefly to the popularity of the great American game of baseball, Station WAAB has twice felt it necessary to change the time of their delivery. Fan mail in satisfactory amount continues to be received.

The committee has been asked by the Public Health Committee of the Massachusetts Federation of Women's Clubs to provide speakers for several local group meetings of the Federation and to prepare several short articles for publication in its magazine on various medical topics suggested by the Federation. Thanks to the *pro bono publico* attitude of the members of the Massachusetts Medical Society, these requests have been satisfactorily met.

The committee has also arranged at the request of the Federation, speakers for three broadcasts sponsored by it and dealing with the present medical situation. The first of these was on the subject of "The Value of Organized Medicine to the People of the Commonwealth" by Dr. Dwight L. Siscoe, the second on "The Dangers of Socialized Medicine" by Dr. Elmer S. Bagnall, and the third on "Adequate Medical Care for the Indigent and Medically Needy" by Dr. Allan M. Butler. The Committee on Public Health believes that the friendly co-operation with this large well-organized group of women is desirable and advantageous to both the Federation and the Massachusetts Medical Society.

The Committee on Public Health held a meeting on April 25. At the meeting the thoughtful and laboriously prepared report of the Committee on Public Relations was considered. It was the unanimous opinion of the members of the Committee on Public Health that the

Massachusetts Medical Society should go on record as favoring the attempt to make available to the indigent and low income groups some form of voluntary non-profit insurance for the payment of medical services of physicians. It was also the unanimous opinion of the committee that the first step should be to secure the passage at the present session of the Legislature of an enabling act to make possible the submission of some plan approved by the Massachusetts Medical Society for such insurance. The committee believes that it is of extreme importance that the Massachusetts Medical Society should have a strong if not the controlling voice in working out any plans for voluntary non-profit insurance of this nature.

The Committee on Public Health at its last meeting held on May 29 voted to recommend the sponsoring of broadcasts during the coming year, under the heading of "Green Lights to Health," if possible with the co-operation of the Massachusetts Department of Public Health. It seems to the committee that larger audiences are obtained under this system than by any other method at present available.

Dr. Jakmauh, the health commissioner, has requested the Massachusetts Medical Society to arrange if possible for the examination of the young men and women in the Massachusetts branches of the National Youth Administration. The committee has had some communication with the commissioner's office, and I shall read a letter which has just come from Dr. Alton S. Pope, deputy commissioner of public health, written at the request of Dr. Jakmauh. (Dr. Denny read the letter.) You will see that this requires the careful medical examination of some 3000 young men and women ranging in age from eighteen to twenty-five. There would probably be various areas which would serve as headquarters—perhaps Boston, Worcester, Springfield and Pittsfield. They have asked the Massachusetts Medical Society to advise as to the type of examination and to estimate the cost of such care. The Committee on Public Health would like the opinion of the Council as to whether it is in sympathy with providing such services for the National Youth Administration under the auspices of the Massachusetts Medical Society, and if so, would it be willing to grant the committee authority to arrange for such examinations, in co-operation with the Department of Public Health, in the different areas by members of the Society living in the neighborhood, provided the remuneration for such examinations would be reasonably satisfactory. No figures as to remuneration have been given, although at the administration centers throughout the country a physician is employed on a part-time basis and receives reasonable compensation for this service according to the amount of work performed in the way of medical care. We are asked only to provide for medical examinations, I gather, on the same sliding scale according to the extent and number of the examinations. The committee believes it is extremely important that such examinations should not be made unless facilities can be arranged for careful examinations.

ROBERT B. OSGOOD, *Chairman*  
GERALD N. HOEFFEL, *Secretary*

## APPENDIX NO. 8

### REPORT OF THE COMMITTEE ON POSTGRADUATE INSTRUCTION

The postgraduate extension courses for the academic year 1938-1939 ended on May 4; this completes the second year of co-operation with the Massachusetts Department

appreciation for the careful planning and enthusiastic work carried on by this group. To the initiative and co-operation of the Worcester committee is due the success of this meeting, and to them the Society owes its gratitude.

RICHARD P. STETSON, *Chairman*

## APPENDIX NO 5

### REPORT OF THE COMMITTEE ON ETHICS AND DISCIPLINE

Since our report to you at the February meeting of the Council, we have held two prolonged meetings.

We have given hearings to two fellows. The first was to a fellow who admitted paying the sum of \$200 to a selectman of a town in order to become the town physician. After hearing his story of the transaction, we asked him for his resignation from the Society, and he at once sent it in to the Secretary.

The second hearing was on charges of unprofessional conduct brought by a layman against a fellow. The layman consulted the fellow with the primary object of the termination of his wife's pregnancy because of her disturbed nervous and mental condition. The fellow sent the patient into a hospital, opened the abdomen, tied off the tubes and removed the appendix when she was between three and four months pregnant. He did not explain to the husband or wife that he had failed to terminate the pregnancy until after the patient suspected that she was still pregnant and the husband called up the fellow and asked him. The committee unanimously (the President of the Society sitting with us) agreed that the fellow's conduct was not ethical, and voted that the President send to him a letter of severe admonition. This has been done.

We have also considered twelve requests for information or complaints of unprofessional conduct of fellows. These have all been carefully considered at the meetings. The requests for information have been answered and the complaints against fellows have been adjusted.

ROBERT L. DENORMANDIE, *Chairman*

## APPENDIX NO 6

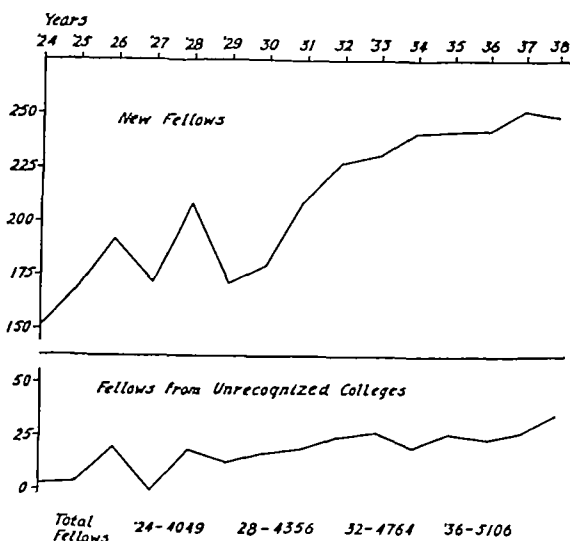
### REPORT OF THE COMMITTEE ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS

During the past year this committee has held three meetings, has personally interviewed 80 applicants from schools unrecognized by the Council, and of these has acknowledged the diplomas of 50.

How to evaluate such diplomas continues to be the committee's most difficult task. Each applicant who presents his credentials almost invariably is able to produce several laudatory recommendations from a number of fellows. Many such letters are obviously solicited, are by no means confidential, and are not written according to the spirit of our by-laws.

By asking for information regarding the abilities and reputation of each candidate from his district secretary just before the meeting of the censors and after the list of names of new applicants has been published in the *Journal* we are able to obtain a few strictly confidential letters concerning applicants, and these are likely to prove informative. At best, however, the manner in which new fellows who are graduated from foreign or unrecognized American schools are elected to the Society is unsatisfactory.

During the past fifteen years there has been a distinct change in character of our fellowship. This is well illustrated by the accompanying graph. The Society grows



steadily in size and importance. It is evident that an increasing number of fellows who are graduates from foreign or domestic schools that we do not recognize are entering the Society each year. Two divergent views on this matter are held by the fellows of the Society in different parts of the State. There are certain fellows who believe that membership in the Society should be open to almost all physicians who are licensed to practice medicine according to the laws of the Commonwealth, and that no strong barriers should be built up to exclude any doctor with sufficient knowledge to pass our state-board examinations. At the other extreme are those who believe that membership in the Society should be strictly limited, and who criticize the work of our committee, saying that already we recognize too many diplomas each year and that we should be more critical.

To the committee the solution of the problem appears to lie entirely in the hands of the district societies. Unless fellows will give the committee confidential information proving the unfitness of any given candidate, we are compelled to accept as honest documents such letters of commendation as are sent in, and if, as of late has happened regularly, the latter far outnumber the former, we are led to assume that the majority of fellows are indifferent or actually favor an enlarged membership made up of an increasing proportion of men of uncertain educational background.

Another problem has recently arisen. This concerns the manner in which physicians who are graduates of foreign schools should be treated by the Society. Lately there have emigrated to Massachusetts from abroad, a number of mature, admirably trained, foreign doctors. They are entirely different from those younger men, unable to get into a reputable domestic school, who have gone abroad and have returned home again with a medical diploma of uncertain usefulness. How should these distinguished older men be treated? Should they at once be welcomed by the Society and admitted to its membership with all privileges or is it better judgment to accept them slowly? The committee has adopted the latter policy and for so doing has received harsh criticism from various quarters. We should welcome discussion on this point so that we may know how the Society as a whole feels about it.

Lewis Siegel, Somerville (Committee John A McLean, Edmund H. Robbins and Edward J Dailey)

Arthur J Taveira, New Bedford (Committee Thomas B Horan, Carl C Persons and Wilfred J Rousseau)

Restoration to fellowship was not recommended for the following former member

Horace G MacKerrow, Worcester (Committee Allen G Rice, Arthur W Marsh, Edwin R. Leib and Roy J Ward)

#### APPENDIX NO 11

##### COMMITTEES APPOINTED TO CONSIDER PETITIONS FOR RESTORATION TO FELLOWSHIP

The following committees were appointed to consider the petitions for restoration to fellowship of the following six former members

For David Barron, Brockton

Alfred L Duncombe, Harrison A Chase and Frederick F Weiner

For Gerard Cote, Salem

Charles L Curtiss, Horace Poirier and John G Adams

For Irving L. Kushner, Somerville

Edmund H Robbins, Charles H Dalton and Louis J Grandison

For John F O'Brien, Fall River

Edward L Merritt, George C King and Emory C Kellogg

For Hyman S Queen, Brookline

Frank S Cruickshank, Charles J Kickham and Frederick Reis

For Harold S Tait, Palmer

Morgan B Hodskins, Sidney R. Carsley and Lucy G Forrer

#### APPENDIX NO 12

##### RESOLUTION FROM THE ADVISORY COMMITTEE OF THE SECTION OF OBSTETRICS AND GYNECOLOGY

The Advisory Committee of the Section of Obstetrics and Gynecology of the Massachusetts Medical Society has at various times talked over the question of expert witnesses in court cases. It is realized that at times the testimony given has been at variance with the best medical knowledge. It suggests that a committee of five be ap-

pointed by the President to study this whole problem. It further suggests that this committee appoint a group sufficiently large to cover all the specialties, from which expert witnesses may be chosen to give testimony. It is suggested that these experts serve without remuneration, or if remuneration is received that it revert to the Society. It therefore wishes to present to the Council the following resolution

BE IT RESOLVED THAT, The President appoint a committee of five to study the question of expert testimony in court cases and to confer with the Massachusetts Bar Association with the hope that rules and regulations may be drawn up in order to improve the situation.

ROY J HEFFERNAN, *Chairman*,  
RAYMOND S TITUS, *Secretary*

#### APPENDIX NO 13

##### STATEMENT FROM DR. JOHN M. FALLON

As the Council knows, there has been debate for three years about the status of the anesthetists in hospital prepayment plans. The situation has been talked over several times in the Council, and the Committee on Public Relations was asked to investigate. This committee appointed a subcommittee consisting of Drs Dunbar, Blaisdell and Tighe. The subcommittee arranged a conference between representatives of the hospital administrators and the anesthetists to meet and settle on a mutually agreeable formula. This formula was finally arrived at last night by representatives of the New England Society of Anesthesiology and Dr Eugene Walker, of the Springfield Hospital, and Mr Frank Wing, of the Boston Dispensary, representing the Massachusetts Hospital Association and the Boston Hospital Council respectively.

These representatives, after discussion and rejection of a plan to pay the hospitals \$5.00 for each anesthesia given by a hospital employee, came to unanimous agreement on the following formula offered by the New England Society of Anesthesiology

We are opposed to the inclusion of anesthetists services under the benefits to be derived under hospital prepayment contracts, and further, opposed to the inclusion of the word anesthesia in the contract, inasmuch as anesthesia is a medical service. We recommend that hospitals which furnish anesthesia bill patients separately for anesthesia as for other extras.

These representatives of the hospital and anesthetists groups will report to their respective organizations, and intend to present a plan for definite action at the next Council meeting.

of Public Health, the United States Public Health Service and the Federal Children's Bureau in giving such courses. The total enrollment for the past year was 795. Details of attendance are shown in the attached table of statistics.

Clinical teaching in syphilis and gonorrhea has been established, under joint auspices of the Society and the government agencies, at the Massachusetts General Hospital and the Boston Dispensary. These clinics have been successful, it is planned to continue this teaching next year. A statistical report of these clinics is attached.

In accordance with the vote of the Council, at its meeting on February 1, 1939, the committee will prepare an outline of courses, in co-operation with the government agencies, and report concerning financial arrangements at the next Council meeting.

The committee wishes to report splendid co-operation from the members of the faculty who have carried on their teaching duties at a high level of efficiency. The committee wishes to express the thanks of the Society to them for their very splendid assistance.

The second annual New England Postgraduate Assembly will be presented on October 31 and November 1, 1939. So far, all the New England state medical societies, except that of Connecticut, have joined with our society in sponsoring this assembly. The program is almost completed, a list of prominent speakers from various parts of this country and abroad have been invited as guest speakers. Sir Thomas Lewis, of England, has already accepted our invitation to appear on the program. Programs will be mailed to all physicians in New England in the autumn.

It is recommended that the Committee on Postgraduate Instruction be continued.

FRANK R. OBER, *Chairman*,  
LEROY E. PARKINS, *Secretary*

#### ATTENDANCE — POSTGRADUATE EXTENSION COURSES

DISTRICT	PLACE	1936	1937	1938	1939
Barnstable	Hyannis	29	21	22	33
Berkshire	Pittsfield	44	41	55	45
Bristol North	Taunton	16	24	27	31
Bristol South	{ Fall River	14	21	20	36
	{ New Bedford	40	45	38	34
Essex North	Lawrence	22	—	31	48
Essex South	Salem	66	62	58	54
Franklin	Greenfield	20	29	28	27
Hampden	{ Holyoke	26	32	33	30
	{ Springfield	50	32	50	40
Hampshire	Northampton	32	29	32	30
Middlesex East	Melrose	14	13	42	21
Middlesex North	Lowell	30	37	32	21
Middlesex South	Cambridge	71	43	80	50
Norfolk	Norwood	29	13	24	—
Norfolk South	Quincy	21	12	30	25
Plymouth	Brockton	27	20	37	35
Suffolk	Boston	—	—	—	180
Worcester	Milford	24	26	23	20
Worcester North	Fitchburg	23	24	46	35
Totals		598	524	708	795

#### TEACHING CLINICS IN GONORRHEA AND SYPHILIS

Gonorrhea —	November 1, 1938 — April 27, 1939
Boston	Clinics 49
Dispensary	Attendance 24 physicians
	Clinic visits 127

Syphilis —  
Massachusetts  
General  
Hospital

November 1, 1938 — April 27, 1939  
Clinics 49  
Attendance 18 physicians  
Clinic visits 135

#### APPENDIX NO 9

##### REPORT OF THE COMMITTEE ON PHYSICAL THERAPY

Until the last few years, there has been very little well directed education in physical therapy. For that reason, the great majority of physicians now in active practice have had little opportunity to appreciate the value of this branch of medicine. Early instruction in physical therapy was provided almost entirely by the manufacturers of apparatus for use in this field. Little criticism, however, can be accorded their work, undesirable as much of it was, for not until comparatively recently have any of our medical schools provided instruction in physical therapy — and some have not yet done so. Appropriate educational procedures can give the prospective physician at least an opportunity to realize something of the possibilities and limitations of physical therapy.

Many physicians seldom use the simpler forms of physical therapy which can be of definite value to patients, and very few have sufficient knowledge to use, wisely, complicated apparatus for this purpose.

To cope with these conditions, the American Medical Association and this society have attempted to provide assistance. During the past year, this committee has supplied speakers for medical meetings and has prepared and published with your approval a pamphlet to help acquaint physicians and medical students with this subject. A cinema has just been completed depicting the actual use of various types of simple and more complex forms of treatment in this field. Application for the showing of this cinema may be made to the chairman of this committee.

The committee earnestly requests members of the Massachusetts Medical Society to acquaint themselves with at least the simpler aspects of physical therapy and to disseminate information concerning this much neglected branch of medicine.

FRANKLIN P. LOWRY, *Chairman*,  
GEORGE R. MINOT,  
ROBERT B. OSGOOD

#### APPENDIX NO 10

##### REPORT OF COMMITTEE APPOINTED TO CONSIDER RESTORATION TO FELLOWSHIP

Restoration to fellowship was recommended for the following seven former members:

E. Olin Angell, Millbury (Committee Charles N. Church, William B. Clapp and Arthur A. Brown)

Parker M. Cort, Springfield (Committee Allen G. Rice, John M. Birnie and George L. Steele)

Israel Kaplan, Salem (Committee J. Frank Donaldson, Leonard F. Box and Arthur W. O'Neil)

Edward Lopaun, Worcester (Committee Charles A. Sparrow, George C. Tully and Erwin C. Miller)

John T. H. Powers, Greenfield (Committee Lawrence R. Dame, Howard M. Kemp and Harry N. Howe)



cysts in the acromial end of the left clavicle. There was a small cystic area in the right maxilla.

On the fifth hospital day an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR. ALFRED O. LUDWIG: May we see the x-ray films?

DR. GEORGE W. HOLMES: These films are quite characteristic of what I would expect you to call it.

DR. LUDWIG: I expect them to be characteristic of hyperparathyroidism.

DR. HOLMES: This is a picture of the skull. The parts which are affected show decalcified bone. This shadow in the kidney is characteristic of the type of calcium deposit we see in these cases. The bones in the pelvis also show decalcification with multiple cysts and fractures. The findings are certainly characteristic of hyperparathyroidism. In these cases which have had an unsuccessful neck exploration the problem is to find the parathyroid tumor. Sometimes the roentgenologist can help. I have seen the tumor in one case, but I cannot see it here. The treatment was not given in this hospital. Dr. Hampton, will you point out the tumor?

DR. AUBREY O. HAMPTON: I think you can see it in this film taken before treatment, the original film taken in 1936.

DR. HOLMES: There is no doubt that there is a mass present, but I wonder how you could be sure it was not an enlarged thymus, for instance.

DR. HAMPTON: I would not know that it was parathyroid. It is a mass.

DR. LUDWIG: As Dr. Holmes said, the x-rays are characteristic of hyperparathyroidism. The data are quite consistent with that diagnosis. Here is a girl who has fractures and cysts in various bones, hypercalcemia, hypophosphatemia, and a tremendous increase of phosphatase, which ought to be between 4 and 6 Bodansky units and here runs up to 73 units. After she came into this hospital, calcium was looked for in the urine and there seemed to be an increased excretion. No mention is made whether there was increased excretion of phosphorus, although it is usually present in hyperparathyroidism. The story of several neck explorations is not an unusual one. Certainly quite a number of cases studied in this hospital had multiple operations done elsewhere without the tumor's having been found. It is interesting that a note is made in the second paragraph that one of the parathyroids showed adenomatous hyperplasia. There is a type of hyperparathyroidism which is caused by hyperplasia of all the parathyroids.

DR. TRACY B. MALLORY: We never saw a section from that gland, did we, Dr. Albright?

DR. FULLER ALBRIGHT: No.

DR. LUDWIG: There was an adenomatous tumor of one, but it seems that the main difficulty was that in the original operation the large mediastinal tumor was not removed. It presumably was an adenomatous parathyroid and was responsible for the trouble. It is evident that the cyst removed could not have been the cause of the difficulty because the blood chemical findings did not change essentially after the operation was performed.

This girl also had a slight amount of anemia, consistent with the disease, and some evidence of impaired renal function. A Mosenthal test showed a concentration of 1014. We should expect her to concentrate to about 1025 at her age without any difficulty. We know she had kidney stones and from the description, perhaps some intrarenal calcification as well. One might suspect secondary renal impairment which again is not unusual in long-standing cases of this disease. The large bone cysts are not uncommon in this disease. The phosphatase is proportional to the amount of bone involvement and when there is a great deal, as in this case, the phosphatase is correspondingly high. With very little bone disease the phosphatase may be normal. The only question is, Should anything else be considered in differential diagnosis other than a disturbance of the parathyroids, hyperplasia of a number of the glands, or tumor of one of them? I can see very little else that we should consider here. In older people senile osteoporosis may confuse one clinically but in this condition the calcium and phosphorus levels are usually normal. Paget's disease in older people may sometimes be confused with this picture. There is nothing in the x-ray to suggest that, and again the calcium and phosphorus levels help to differentiate as they are usually normal or slightly elevated in Paget's disease, while the phosphatase is elevated, and may be very high. Then, too, in Paget's disease the uninvolved bones are normal, whereas in hyperparathyroidism all the bones usually show some decalcification. Osteomalacia I do not believe need be considered. That is a condition in which decalcification of the bone is due either to a failure of absorption or to a decreased intake of calcium, and in that condition the phosphatase is increased, the calcium is low or normal, the phosphorus is low, and there is usually no increase in excretion of calcium in the urine. One does sometimes see multiple solitary cysts of bone, but they usually can be differentiated aside from the x-ray findings by calcium and phosphorus studies. Occasionally cases of pituitary basophilism or adrenocortical tumors, where there is osteoporosis,

# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED  
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 25261

### PRESENTATION OF CASE

A twenty-two-year-old single woman was admitted for study.

At the age of fourteen years the patient gradually developed pain in the left mid-thigh. Two months later she began to limp. A year later she entered an outside hospital where a diagnosis of cyst of the neck of the left femur was made. At this time she weighed 71 pounds and was 53 inches tall. A tumor-like mass was also noted in the left maxilla just above the second bicuspid and first molar teeth. The cyst of the femur was curetted. During the next three years she used crutches. She became quite thin. During the fifth year before admission she was operated on twice, once for the removal of a cyst of the jaw and five teeth, and another time for a cyst in the lower third of the right femur. Blood studies at that time showed the calcium to be 14.3 mg per 100 cc, the phosphorus 2.6 mg, and the serum protein 6.3 gm.

X-ray films showed cyst formation and decalcification of nearly all the bones in the body. No renal calculi were seen. A neck exploration was then done. This showed no lesion on the right side, but a nodule was found on the left which microscopically was said to exhibit "adenomatous hyperplasia" of a parathyroid. Two weeks post-operatively the serum calcium was 16.8 mg and the phosphorus 2.4 mg per 100 cc. X-ray therapy was then begun over the right and left cervical regions, including the upper two thirds of the chest. A total of 8712 r was given over a period of many months. Blood serum studies at monthly intervals showed that the calcium varied between 10.8 and 14.3 mg per 100 cc, the phosphorus between 1.1 and 1.7 mg, the protein between 6.0 and 7.4 gm, and the phosphatase between 24.5 and 33.9 Bodansky units. X-ray therapy was discontinued the next year. Following this the serum calcium ranged from 11.6 to 14.2 mg per 100 cc, the phosphorus from 1.6 to 4.3 mg, the protein from 6.8 to 7.8 gm, and the phosphatase from 18.4 to 73.6 units. Three years before admission a second neck exploration was done. At this time the pretracheal muscles were sectioned

and the thyroid was completely exposed on both sides. A large area extending from above the thyroid cartilage down into the substernal space was explored and both sides examined thoroughly by direct vision and palpation. No evidence of gland enlargement or suspicious tissue could be found. During the next two years she suffered from no significant symptoms. Her serum calcium and phosphorus levels remained essentially unchanged. Eight months before entry a cyst developed in the right maxilla and gradually increased in size. Six months later x-ray films showed a tumor in the region of the right antrum but no bone destruction. The basal metabolic rate was +10 per cent. The serum calcium was 15.2 mg per 100 cc, the phosphorus 2.5 mg, the protein 6.4 gm, and the phosphatase 26.3 units. A Mosenthal test showed the urinary specific gravity to vary from 1.009 to 1.014. She entered this hospital for further study.

Physical examination showed a puerile but well-proportioned girl weighing 85 pounds, and measuring 59 inches in height. There was a large cyst in the right maxilla which appeared to extend into the right antrum. The thyroid gland was not palpable and there were no nodules in the neck. There were a few light-brown pigmented areas over the chest and abdomen measuring up to 3.5 cm in diameter. The breasts were small. Examination of the chest was negative. The blood pressure was 118 systolic, 78 diastolic. The genitalia were normal. The extremities showed bowing of both tibias. The left leg was slightly shorter than the right.

The temperature was 98.6°F, the pulse 120, and respirations 25.

The urine showed a specific gravity of 1.020, 20 to 30 white cells per high-power field, 3 to 5 red cells, and no casts. There was a large amount of calcium by rough tests. The blood showed a red-cell count of 3,900,000 with 70 per cent hemoglobin. The nonprotein nitrogen of the serum was 20 mg per 100 cc, the calcium 14.5 mg, the phosphorus 2.0 mg, the protein 6.8 gm, and the phosphatase 23 units. A phenolsulfonephthalein kidney function test was normal.

X-ray films showed generalized decalcification of the bones and scattered cystic areas. There was an old probable pathologic fracture of the neck of the left femur with coxa vara deformity. There was a large stone in the left kidney pelvis with several small stones in the calices and one small stone in the lower pole of the right kidney. Chest films showed a mass 5 by 2.5 cm in the right upper mediastinum displacing the trachea and esophagus slightly to the left. There were small

## ANATOMICAL DIAGNOSES

Hyperparathyroidism

Adenoma of the parathyroid gland

## PATHOLOGICAL DISCUSSION

DR. MALLORY The ultimate prognosis on this case depends on two factors first, the slight possibility that she will develop another parathyroid adenoma, or a large recurrence of this one, and, second, the degree to which her kidneys have been permanently damaged. It is too early to assess this last factor accurately in her case.

## CASE 25262

## PRESENTATION OF CASE

A forty-three-year-old married woman was admitted complaining of difficulty in swallowing.

Nine years prior to admission she first experienced a sharp stabbing pain between the shoulder blades on swallowing large mouthfuls of food. During the next four years she had about four similar attacks. Five years before entry the pain on swallowing occurred more frequently. She visited an outside hospital where x-ray films were reported negative. Subsequently she was essentially free from pain until about one year before admission when the pain gradually became quite constant with the swallowing of solid food. Two months later she noted stabbing pains between the shoulder blades, along the sternum, and in her esophagus each time she swallowed. These pains came on soon after going to bed and lasted throughout the night. The following day she visited her physician who advised that the basal metabolic rate be determined. This was low and thyroid treatment was started. Four months later she began to notice a dry feeling in her throat and esophagus when she attempted to swallow. She was found to be anemic and iron therapy was begun. Three months later she complained of difficulty in swallowing air, belching, and difficulty in breathing. X-ray films now showed a constricting lesion in the esophagus. Esophagoscopy done six weeks before admission showed a firm, red, slightly nodular mass at a point 30 cm from the incisors which completely obstructed further passage of the esophagoscope and appeared to encircle the esophagus almost completely. Several biopsies taken from this area were negative. Two weeks before entry another esophagoscopy was done and a number of more satisfactory biopsies taken. The pathological report on these was leukoplakia. Following these procedures the patient was nauseated and vomited. She regurgitated everything eaten.

Physical examination showed a well-developed,

fairly well-nourished woman in no acute distress. Examination of the neck was negative. The heart was slightly enlarged to the left. The blood pressure was 112 systolic, 68 diastolic. The abdomen was slightly tender in the right lower quadrant. Pelvic examination was negative except for a reddened cervix and thick yellow discharge. Rectal examination was negative.

The temperature was 98°F, the pulse 70, and the respirations 18.

Examination of the urine was negative. The blood showed a red-cell count of 4,180,000 with 80 per cent hemoglobin and a white-cell count of 5800 with 62 per cent polymorphonuclears. The non-protein nitrogen of the blood serum was 17 mg per 100 cc., chlorides 98.5 milliequivalents, protein 7.2 gm per 100 cc. A blood Hinton test was negative.

An x-ray film of the chest was negative. A barium examination of the esophagus showed obstruction which started opposite the seventh dorsal vertebra and extended downward a little more than 4 cm. Within the area of obstruction there was an irregular but constant pattern suggesting ulceration. The obstructing lesion reached far upward posteriorly. It was annular for a distance of 3 cm. The lower edge of the lesion was very clear cut. No soft-tissue mass was visible within the area of abnormality. The esophagus below the lesion appeared perfectly normal. Above the lesion it was dilated.

On the third hospital day another esophagoscopy was done.

## DIFFERENTIAL DIAGNOSIS

DR. MILTON H. CLIFFORD In summary, this is a woman who apparently has had a lesion in the esophagus, or extrinsic to it, for nine years but showed nothing by x-ray some five years ago and whose symptoms have progressed rapidly only within the last year. At the present time the patient has an annular lesion with posterior extension in the esophagus. There is no reason to suppose that the lesion is primarily extrinsic to the esophagus—no soft-tissue masses being visible. Any lesion must be one that has been present over a long period of time.

I should like to see the x-ray films.

DR. RICHARD SCHATZKI There are no signs of tuberculosis or pressure on the vertebrae. This is the small area at the junction of the middle and lower thirds with complete destruction of the mucosal relief. There is shelf formation at the upper end of the lesion with slight dilatation of the esophagus above the lesion and normal esophagus below.

DR. CLIFFORD What are the possibilities of a

decalcification, and a disturbance of the calcium and phosphorus metabolism, may be confused with hyperparathyroidism, but there are many other features characteristic of these conditions that are not present here, such as obesity, hypertension, hirsutism and red, striated skin. I do not see how one can reach any other conclusion but that this is a case of hyperparathyroidism. I believe that in this case there was a tumor in an abnormally situated parathyroid gland in the mediastinum, where a number have been found in the past.

DR. HOLMES: I have now found out the secret to this case and I think it might be worthwhile to point out some additional factors. This is the film that was taken before the patient came to this hospital. We realize that it was taken with the patient lying on her back and at a fairly close target distance. This shadow which I was afraid might be artefact evidently represents the tumor. It is very much magnified. Following this the patient had a series of x-ray treatments. We have no proof that they reduced the tumor—they may or may not have. The tumor is present in this second film and appears very much smaller, but the way the film was taken and the target distance might account for the apparent diminution in size.

DR. ALBRIGHT: This of course is a perfectly classical case of hyperparathyroidism and I think the forty-first in our series. It is interesting that each case teaches something new. We learned one thing from this case. If you look at the stone by x-ray, it has the appearance of a snowflake with radiation from a central point. We did not know what type of stone this signified. We thought, having seen a stone with this same appearance in another case of hyperparathyroidism, that such a structure might be seen only in that condition. We are in the habit of considering all hyperparathyroid stones as composed of calcium phosphate. We therefore jumped at the conclusion that it was calcium phosphate and thought it might be dissolved by citrate solutions introduced from below. After three days of attempted dissolving, there was no change. In the meantime we took out a stone of the same type from another patient and it proved to be pure calcium oxalate. We found after an operation in the present case that the stone we were trying to dissolve was also calcium oxalate. That explained our lack of success. We now know that all star-shaped stones are made up of calcium oxalate. This is very important since the treatment of a stone depends on its chemical composition.

The operation was done by Dr. Oliver Cope.

He entered the upper mediastinum, found the tumor easily and removed it. He left a small piece. When one has a hyperparathyroid tumor with marked bone involvement one does not take out the whole tumor at one time. She had moderate postoperative tetany.

DR. MALLORY: Would it be a fair assumption, with the marked change in the calcium and the phosphorus, to say that the tumor must be a large one?

DR. ALBRIGHT: We never have seen a very small tumor causing as marked disease as this.

DR. MALLORY: So that if it had not been found in the course of two neck explorations it must have been in the mediastinum, assuming that the operator was competent?

DR. ALBRIGHT: Perhaps, but they do get behind the esophagus. A parathyroid can be fairly large and still be missed. They mold themselves in the neck behind and around the other structures and do not cause them to bulge.

A PHYSICIAN: Do you think material removed at the first operation was hyperplastic parathyroid?

DR. ALBRIGHT: No, I think it was normal.

A PHYSICIAN: They said it was embedded in fat.

DR. ALBRIGHT: It certainly was not hyperplastic, if there was any fat.

DR. HOLMES: This is the second case in which repeated explorations have failed and yet the tumor was visible all the time in the x-ray films.

DR. ALBRIGHT: In the best plates, those with barium in the esophagus, you can see the outline of the tumor very easily.

A PHYSICIAN: Do you think the calcium oxalate stone has anything to do with hyperparathyroidism?

DR. ALBRIGHT: Yes. There is no reason why a calcium oxalate stone should not form in this condition. We have one other case.

DR. MOSES S. STROCK: May I say a word, Dr. Mallory? This case, it seems to me, presents a typical history of well-advanced hyperparathyroidism so far as the teeth are concerned. Several years ago she had her teeth removed. If her dental films could be shown they would present all the signs previously described here as being associated with hyperparathyroidism. I think any member of the x-ray department could make a diagnosis from the dental films alone.

#### PREOPERATIVE DIAGNOSIS

Parathyroid adenoma with hyperparathyroidism

#### DR. LUDWIG'S DIAGNOSIS

Hyperparathyroidism

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## FAMILY TRADITIONS IN MEDICINE

An article in the *Boston Herald* last month, concerning the medical tradition in the Kittredge family, of North Andover, brings immediately to mind other medical families of note. Nine successive generations in the Kittredge family, however, beginning in 1660 when Captain John Kittredge, an irregular but apparently able practitioner, fled from England to this country, and coming to date with Dr. Joseph Kittredge who celebrated his eighty-first birthday on May 21, seem to constitute an all-time record.

We are mindful of a number of medical families that have won our respect and admiration, although, indeed, the same might be said of the other professions and the trades and businesses as well. Various cities have had their own honored medical names where the tradition of service has

gone into three, four and even five generations, we point with pride to our Warrens, our Jacksons and our Shattucks, to our Cabots and our Minots and others—solid rocks on which the foundations of medical progress in our community were largely laid.

In some instances a number of individuals of varying ability but of unquestioned integrity have served to carry on the family tradition, in other cases a father and a son have each been of such prominence that a sort of medical halo has seemed to place itself on the family name in their behalf.

There is a nobility about this pursuit of a family tradition, whether it be in medicine, in the law or in trade, that seems to result from the unswerving loyalty of each successive member to that tradition, and the desire of each to acquit himself well in the eyes of his predecessors and of his world. In the accomplishment of this object, ability in general must have been inherited, as well as ambition of the truest and consequently of the most modest type, the most important incentive, however, must have been the constant association with a respected mode of life.

It is the modern exemplification of the old guild system. In this way the art of making the world's most marvelous imitations of flowers has been developed and carried on until a successor was lacking, the spirit of integrity and honor associated with a family name has been made part of the tradition of every business from banking to marketing, generations have lived and died in the honorable pursuit of the law and in the ministry of the church.

The family calling can be a splendid tradition, but it can be so only as the result of freedom of choice. Give a son every opportunity to see the noble side of a profession, and give him an opportunity to see it nobly followed. Let him know also the disagreeable side—the fatigue and the discouragement and the disappointments. Then let him make his choice, and support him in his decision.

A considerable degree of idealism, as well as a good deal of glamour, attaches itself to this following in the family footsteps, but it cannot be forced

benign lesion in the wall of the esophagus? You would say the mucosal pattern is destroyed?

DR SCHATZKI It is completely gone

DR CLIFFORD The possibility of a benign lesion's having been present for a good many years with the recent development of a superimposed carcinomatous process must be considered. There is no evidence to make us think of a neurofibroma. Lymphoma is possible, but there are no other signs such as enlarged lymph nodes, liver or spleen and it is rather a long time for lymphoma to be localized in one spot. Syphilis is a dim possibility, but again it is a long time. Whether the signs of chronic endocervicitis mean gonococcal infection or not, I do not believe is important except that its presence might further suggest syphilis. The Hinton test, however, was negative. A myoma would be a very unlikely possibility. There has been no sign of bleeding at any time. A sarcoma I should consider to be more likely intrinsic, and also to have shown more definite signs of obstruction earlier in the nine years. My final guess would be a carcinoma possibly developing on top of a benign lesion. As a second guess I would mention a leiomyoma.

DR EDWARD B. BENEDICT We thought from the beginning in this case that we were dealing with carcinoma of the esophagus, but we had a great deal of difficulty in proving it because the lesion was rather small and showed only slight nodular formation. On the third attempt we did get a positive biopsy of carcinoma. I should like to point out that, in women, carcinoma of the esophagus is apt to run a long course and occur at an early age with prolonged so-called pre-cancerous symptoms. This patient had no metastatic disease, so far as could be determined was a good operative risk and an esophagectomy was performed by Dr. Edward D. Churchill.

DR TRACY B. MALLORY A segment of the esophagus was completely removed in this patient, she has safely recovered from that operation and is on the ward waiting for reconstruction of a new esophagus.

DR EDWIN HAMLIN The operation was planned with great care by Dr. Churchill and was suc-

cessful. He first performed a jejunostomy for feeding, then an esophagostomy, to draw the upper end out through the neck, and at the third stage he removed the section of esophagus with the growth and freed up the distal portion of the esophagus down to the diaphragm. At the fourth stage he removed the distal esophagus from the thoracic cavity and brought it out through the abdominal wall.

#### CLINICAL DIAGNOSIS

Carcinoma of esophagus

#### DR CLIFFORD'S DIAGNOSIS

Carcinoma of esophagus, ? developing on a benign lesion

#### ANATOMICAL DIAGNOSIS

Epidermoid carcinoma of esophagus, Grade II

#### PATHOLOGICAL DISCUSSION

DR MALLORY The tumor was about 5 cm in length and had not yet quite completely encircled the esophageal wall, it went about three fourths of the way around. There was a relatively small area of ulceration. There was a good margin of normal esophagus at either end of the resected segment. On the other hand the tumor had invaded through the muscular layer and we found tumor in the perineural spaces and lymphatics, so that it is distinctly doubtful if it has been entirely removed.

A PHYSICIAN Has anyone looked up the literature on surgical treatment of cancer of the esophagus? How many successful cases have been reported?

DR BENEDICT About thirty have been successfully removed and several patients have survived for one or two years. Torek's first case in 1913 lived for thirteen years. She was a woman of sixty-seven at the time of the operation, and died of pneumonia at the age of eighty.

DR SCHATZKI Was the tumor in the lower end of the esophagus?

DR BENEDICT No, mid-thoracic.

hours. The breech came down and was easily extracted under light ether anesthesia. There were no external tears, and very little bleeding. The patient was given 3 minims of posterior pituitary extract. Immediately following this medication, the patient strained violently, the fundus, inside out and with the placenta firmly attached, appeared at the vulva. Ether was resumed, and the placenta carefully peeled off. During this performance, there was surprisingly little bleeding. The fundus was grasped with one hand, squeezed carefully and with no difficulty replaced in the abdominal cavity. The cervix which had contracted about the inverted uterus was very easily dilated. The patient was given 5 minims of posterior pituitary extract, and the operator's hand was held in the uterine cavity until there was definite evidence of contraction. The cervix was then grasped with sponge forceps and brought down to the introitus for inspection. There was very little bleeding. The cervix was intact. The vagina was firmly packed and the fundus palpated. It was symmetrical and in normal position. During the manipulation the patient's pulse rose to 140 but remained of good quality. Her color was good and there was no sweating. She came out of the ether rapidly. She was watched carefully for one hour, during this time the fundus remained firm, there was very little bleeding and her pulse rate gradually dropped. The vaginal packing was removed twenty-four hours later.

Her convalescence was afebrile. The uterus involuted normally and the lochia was not foul at any time. The cervix was examined on the tenth postpartum day and appeared normal and well contracted.

*Comment.* This case of spontaneous inversion of the uterus may have resulted from the 3-minim dose of posterior pituitary extract. There was very little bleeding because the placenta had not separated at all when the inversion occurred. Furthermore, the fundus was replaced so quickly and so easily after the placenta had been removed and it remained so well contracted that the sinuses had no opportunity to remain open. The use of the vaginal pack after the uterus had been replaced was probably valueless. This condition, potentially so serious, was treated so quickly and so expertly that it is an example of how acute inversions should be handled. Practically all acute inversions, if treated immediately, can be replaced in this manner. It was extremely fortunate that so small an amount of blood was lost in this case, the hemorrhage is tremendous in most cases. Transfusion often plays a very important role in treatment.

## RHEUMATIC FEVER\*

Rheumatic fever is a common disease in Massachusetts. It is often called inflammatory rheumatism. It usually begins between the ages of five and fifteen years, although it may start in adult life. In some way, sore throats and colds are very closely connected with the beginning of rheumatic fever. This close association has been known for many years, but we do not yet know the exact cause of the disease. Chorea, commonly called St. Vitus's dance, occurs very frequently during rheumatic fever or in patients who have had rheumatic fever in the past.

At the beginning of the disease, the child or young adult often complains of a sore throat and is sick for two or three days, usually with slight fever. Recovery seems complete. Within a few days, or sometimes not for two or three weeks, there is the rather sudden onset of illness with high fever, a rapid pulse and sweating. Often pain occurs in the patient's joints—most frequently in the ankles, knees, hips, wrists, elbows and shoulders. The pain may be severe or slight, and at times the joints may be swollen and very tender. It is common for the pain to jump from one joint to another. There may be other symptoms such as nosebleeds, pain in the chest or stomach, vomiting and often rapid breathing. The diagnosis should be made only by a doctor.

Although the joints may be very painful at the beginning of the illness, this is not always so, and pain may be mild or absent. Rheumatic fever does not result in any permanent joint trouble. It is the heart disease caused by rheumatic fever which is the most serious part of the disease. In most cases, heart disease begins soon after the patient becomes sick. We now know that the heart disease is not a complication, but is usual in severe cases. All three layers of the heart are damaged. First, the lining, causing trouble with the proper working of the valves—often called 'leakage of the valves', second, the heart muscle, causing enlargement of the heart and, often, heart failure, third, the outside covering of the heart.

Once rheumatic fever has begun it usually lasts for weeks, more often months, and sometimes several years. It usually persists a shorter time in adults than it does in children. Adults also seem less likely to develop heart disease than are children. One of the worst features of rheumatic fever is that the patient is apt to have repeated attacks. These new attacks, or recurrences, are especially likely to take place during the first five or six years after the disease begins. For this reason, it is important for the patient to see his doctor often for some years after the initial attack. These repeated attacks of rheumatic fever usually follow sore throats and colds, but they may follow accidents, operations or various other diseases or they may happen without any known cause.

The symptoms during chronic rheumatic fever may be very mild, but are still important. I have told you what some of them are. Others are loss of weight, a non-itching rash, which does not last long, on the body, arms or legs, small, painless lumps or nodules over the joints, and jerky movements of the muscles indicating St. Vitus's dance. After these symptoms go away, laboratory tests may show that the disease is still going on. It is important to keep the patient quiet so long as there are symptoms or laboratory tests which show that the disease is still active.

A patient with rheumatic fever should be under the care of a doctor. When very sick, the patient needs the best medical care and good nursing. These patients are

\* A Green Lights to Health broadcast given by Dr. T. Duckett Jones on Wednesday, April 26, and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

If the family tradition is due to die out with the boy that wants to be an artist instead of a doctor, then let him take his paints and his palette and hie him to the Latin quarter, there to work out his own destiny

## CONTROL OF CANCER

THE tremendous complexity of the problems of cancer control and of research into the nature of cancer is such as to render any clear and comprehensive statement of our present knowledge extraordinarily difficult

Recognizing the value of stock-taking, even though somewhat superficial, a committee appointed by the Surgeon-General of the United States Public Health Service has prepared a report\* of the knowledge acquired in the last thirty years through experimental research, released by Dr Voegtlin, chief of the National Cancer Institute. The committee preparing this report consisted of Drs James P Murphy, John Northrop, Stanhope Bayne-Jones, Ross Harrison and Clarence C Little

The report brings out that a large number of diverse ways are known by which cancer may be produced. However, the exact mechanism by which these different substances actually alter cellular activity to cause cancer has not as yet been elucidated. This line of research, intimately concerned with cellular physiology, is being actively pursued in a number of different laboratories, but little information has been obtained as to why the cancer cell has unlimited and uncontrolled powers of growth within the body. Obviously, the complexity of this problem is such that a great deal of fundamental work will have to be done before any appreciable progress can be made.

The relation of heredity to cancer has been considerably clarified in the past, but still more work needs to be done, particularly in view of some of the recent experiments that emphasize the importance of certain extrachromosomal aspects of the hereditary transmission of relative resistance or susceptibility to the development of cancer

Of course, active search for new methods of treatment is an essential of any research program. Although we recognize that through education, leading to detection and treatment of early cases, we could achieve far better results with our present methods than are now being obtained, nonetheless it must be realized that even the best of our present methods leaves much to be desired. Much damage to normal tissues is still inevitable in eradication of the cancerous growth. How far one may go in finding a truly selective agent for the destruction of cancer cells is perhaps too nebulous for speculation, but nonetheless intriguing and important.

## MASSACHUSETTS MEDICAL SOCIETY

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

RAYMOND S. TITUS, M.D., *Secretary*  
330 Dartmouth Street  
Boston

### ACUTE INVERSION OF THE UTERUS

Mrs. C. K., a thirty-year-old primipara, entered the hospital February 19, 1939, at term and in labor.

The patient's family history was negative except that her maternal grandmother died of carcinoma of the breast.

The patient had had measles, mumps and scarlet fever as a child. She also gave a history of some kidney or bladder trouble. She had never had an operation. Catamenia began at the age of twelve, were regular with a twenty-eight-day cycle and lasted three to four days, without pain. Her last period was May 12, 1938, making her expected date of confinement February 19.

Physical examination at the beginning of her pregnancy revealed a well-developed and nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant. The blood pressure was 110 systolic, 80 diastolic. Pelvic measurements were normal. The abdomen was extremely firm on palpation. The course of her pregnancy was entirely uneventful. Routine examination at her last office visit revealed a breech presentation.

Labor was of short duration, lasting about five

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.



many patients with rheumatic fever. It seems to do no good, and at times may be harmful. I should advise against its use.

Q Is exposure to the sun of benefit to these patients?

A. If a patient is not very ill, exposure to the sun in small amounts is probably helpful. Heavy tanning is unnecessary. Actual sunburn should not be allowed. We have seen fresh attacks of rheumatic fever associated with severe sunburn.

Q In your discussion you mentioned loss of weight in connection with active rheumatic fever. Just what has weight to do with the disease?

A. Loss of weight and failure to gain weight are often found when the patient has active rheumatic fever, even mildly. As patients with rheumatic fever improve, they almost always gain weight. Weight is hence a rough guide to the patient's condition and should be watched.

Q What is meant by a person who says that he has "rheumatism"?

A. Rheumatism comes from the Greek word meaning "to flow." It has hence been used for all types of diseases in which pain occurs in different joints or even muscles. More recently, rheumatism has been used by doctors in those diseases in which the patient has real—often permanent—changes in the joints. This is more properly called arthritis, of which there are several types. Joint pain may occur in rheumatic fever, but may be mild or absent,—never permanent,—and heart disease is the important part of the condition. Hence, rheumatic fever should not be called rheumatism.

Q Colds and sore throats seem to be important in rheumatic fever. Have you any suggestion as to how these may be prevented?

A. There is no sure way of preventing colds and sore throats. Vaccines are not thought to be very helpful. The best way to prevent these infections is to stay away from people having them, as they are highly contagious. This, of course, is difficult. The rheumatic fever patient can help protect himself by staying away from crowds when colds are common, and even by keeping out of the way of brothers and sisters when they are sick. A common source of colds is the school. Intelligent teachers can help prevent their spread. It is wise for the rheumatic fever patient to have a room alone, or at least to sleep alone. He should avoid exposure, drafts, and so forth.

Q What is the present need in Massachusetts for the care of rheumatic fever patients?

A. The greatest need is for places where patients can receive long bed care during the stage of active rheumatic fever. Especially is this care needed for boys over twelve years of age and for young men. Very few beds exist for these groups. This is a crying need, and every effort should be made to meet it.

## DEATH

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His widow, two daughters, two sons, a grandson and two sisters survive him.

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The first case, from the medical wards, was presented by Dr. A. C. England, Jr. A fifteen-year-old boy came in with a chief complaint of intense pain in the lumbar region of three weeks' duration. He had a past history of four attacks of chorea between the ages of eight and ten, each lasting one month. Two years previously he had developed osteomyelitis of the left hand, the fourth finger had to be amputated. Three weeks before entry he was injured while playing basketball and two days later developed intense pain in the left flank and then in the right flank. He was in bed at home two weeks, and as fever developed, he was brought into the hospital. On physical examination, one observed a feverish boy with a positive Kernig, stiff neck, costovertebral angle pain and tenderness, spasm of muscles, and a slight scoliosis at the tenth and eleventh thoracic vertebrae, concave to the left. His temperature was 102°F, the white blood-cell count was 13,000 with 80 per cent polymorphonuclears, lumbar puncture done twice showed clear fluid with no cells and a negative gold sol curve and Wassermann test, the blood Wassermann test was also negative. He was given bed rest and did well, with no discomfort and with lessening of the pain and stiffness of the neck. The scoliosis increased a bit but then made no further progress. By x-ray, a process in the base of the left lung cleared in five days. The spine plates were negative, but there was a shadow behind the heart which was associated with the scoliosis, with some erosion of the tenth and a narrowing of the joint space between the tenth and eleventh thoracic vertebrae. The patient was placed in a posterior shell and at present is afebrile.

Dr. Marshall Fulton in discussing the case brought up the possibility of the x-ray shadows being due to pus from the vertebra. Dr. Merrill C. Sosman re-read the x-ray films as showing a posterior gutter empyema. The first film showed a bronchopneumonic process, which probably went on to pleurisy and then empyema, with associated narrowing of the intervertebral space. However, this sequence might well have been in reverse order. Dr. Sosman thought the process was too acute to have been due to an acid-fast infection in the disk.

The second case was presented by Dr. C. F. Goeringer, and was from the surgical wards. The patient, a sixty-eight-year-old woman, was admitted March 5 for treatment of a three and a half months' progressive enlargement of a mass in the neck. She had had no thyrotoxic symptoms and had not lost any weight. Two and a half weeks before entry she began to have dyspnea and then orthopnea five days before entry her respirations became wheezing in character, and two days before became quite

best treated in hospitals. Hospital care becomes even more important if the patient has heart failure. As the patient improves, plans must be made for good bed care for a period of months. It is unfortunate that rheumatic fever occurs most commonly in families where the income is small and the home is crowded. Under such conditions it is hard to give the patient proper bed care for long periods of time. There exist a few hospitals and foster homes where this long time bed care may be given, but there are not enough beds at present to care for the large number of rheumatic fever patients. It is important during these long rest periods to allow the patient to learn something about the disease he has, to keep his mind occupied in instructive work or play, and to have his schooling continue. Massachusetts should be proud of an educational system which provides visiting teachers for these patients in their homes. All institutions giving long time care also provide schoolteachers.

There is much good advice which the doctor can give the patient or the family when the rheumatic fever is no longer active. Home conditions should be bettered, good nourishing food provided, rest periods suggested, and physical activity directed. The patient must be warned to avoid exposure to bad weather and to persons with colds and sore throats.

Rheumatic fever is important to us all. It causes 99 per cent of all heart disease in childhood and early adult life. For this reason, rheumatic fever is one of the important medical problems of the day. While rheumatic fever is a serious disease, by no means all patients with rheumatic fever develop severe heart disease or even have their future lives changed because of the disease. Many patients who have been closely watched over a period of years have little or no heart disease and are able to lead normal lives. In some cases, evidence of heart disease may disappear entirely, if the patient remains free of these later attacks of rheumatic fever. The severity of the attacks of rheumatic fever is the important point with regard to its effects. Some are so mild as to be discovered only by the physician. This is a further reason for frequent visits to the doctor.

In summary, the problem becomes one of proper care over a period of years. When very ill, the patient needs to be in a good hospital. Except in rare cases, long bed care must be given as the patient improves. With care to avoid sore throats and colds, further attacks may be prevented. The doctor should be seen often to determine whether or not the patient has active rheumatic fever, and to give helpful advice. If this can be done, in a majority of the cases the patient will be able to be physically active as he grows older.

\* \* \*

Q Is rheumatic fever inherited?

A Much study is at present being given to this question. We know that rheumatic fever often occurs in more than one member of a family, in fact, at least as often as does tuberculosis. Certain physicians believe that the disease tends to run in families. As yet, we cannot state for sure that it may not be mildly contagious. This may be more important than heredity.

Q Do you believe then that it is contagious?

A It has been well shown that rheumatic fever spreads through families as the result of sore throats and colds. Exactly how these infections play a part in rheumatic fever is unknown, but it is possible that during colds and sore throats the agent causing rheumatic fever may be spread from one person to another. However, this remains to be proved.

Q Do you think the cause of rheumatic fever will ever be found?

A Yes, but it may take many years. Several groups of research workers are carefully studying the disease. It is a very difficult problem, but one that physicians should be able to solve in time.

Q If a patient has had rheumatic fever with but little or no heart disease, what are the chances of his remaining well?

A The chances are excellent. The first two or three attacks of rheumatic fever usually cause the greatest amount of heart disease. If the patient has but little heart disease six or eight years after the first attack, the chances are greatly in favor of his remaining well.

Q Is diet a very important part in the treatment or prevention of rheumatic fever?

A In a general way, yes. There is no single food which is all important. It is wise to have an abundance of fresh vegetables, milk and fruit juices. Fruit juices supply vitamin C, which all patients with chronic infection need in large amounts. It is also wise to give the patient vitamin D during the winter months. This can be done with the use of cod liver oil or other preparations advised by the doctor.

Q You mentioned nosebleeds. Do they mean that a person has rheumatic fever?

A Most nosebleeds in children are caused by injury, such as blows or picking the nose. Nosebleeds occur frequently without injury during rheumatic fever, but the patient usually has other symptoms, and only a doctor should decide that they mean active rheumatic fever.

Q Why do you suppose rheumatic fever is commoner in families with small incomes?

A That is not answerable at present. It is probable that with poor living conditions and overcrowding, the patient comes in touch with more infectious agents and larger doses of them. In addition, poorer food may help lower the resistance of the patient.

Q You have not mentioned the tonsils. I was always told they could cause rheumatism, and I wonder if this is true.

A Formerly many doctors believed this to be true. Many patients, however, get rheumatic fever long after their tonsils have been removed. Also, we have noticed that taking out the tonsils seems to have little effect on the course of rheumatic fever. We still believe the tonsils should be removed if the patient has very many sore throats, or tonsillitis. Such an operation, however, will not cure the disease.

Q If a person in early adult life has rheumatic heart disease, what advice should be given him about exercise?

A If the heart disease is slight, and he has not had rheumatic fever for some time, the doctor will probably allow moderate exercise. If rheumatic fever is present, even mildly, he needs bed care. If rheumatic fever has been recent, an inactive life will be advised. If the rheumatic heart disease is moderate to severe, the doctor will advise moderation in exercise. In some patients it is necessary to avoid sudden strains, such as occur in violent games. In others, the patient must be taught to lead a quiet life and even trained to do some kind of work which can be performed without effort.

Q I wonder if the new drug, Prontylin, is helpful in rheumatic fever.

A No. Once a rheumatic patient has a sore throat it will not prevent a fresh attack of rheumatic fever. This drug is also known as sulfanilamide. It has been given to

many patients with rheumatic fever. It seems to do no good, and at times may be harmful. I should advise against its use.

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labored. Physical examination revealed an orthopneic wheezing woman with a temperature of 102°F and equal blood pressures in both arms. In the right side of the neck was a baseball sized mass, firm, non fluctuating, non-tender and slightly movable. X-ray films demonstrated the trachea deviated to the left. She was transferred to the surgical service, and two days later a decompression operation was performed. Biopsy suggested a tumor compatible with a lymphoblastoma. The patient's course improved following two x-ray treatments. At present she can lie flat in bed without distress. She is to have further x-ray therapy.

Dr Joseph C. Aub remarked that neoplasm of the thyroid gland was almost never hyperactive in function. Dr Elliott C. Cutler stated that the patient had had serious obstructive signs and that immediate x-ray therapy would have surely caused edema and death. For that reason a large specimen was taken at biopsy. Dr Cutler said that at the time of operation he did not believe it was a lymphoblastoma, but also that it was not typical of an epithelial tumor of the thyroid. Dr Guy D. Ayer reported that preliminary pathological study indicated an undifferentiated small-cell malignant tumor, the cells being related to blood vessels and occasionally containing vacuoles. Therefore, he predicted a thyroid tumor of rare type.

The main program of the evening was a symposium on "How Does One Study Cancer?" presented by six of the investigators from the Collis P. Huntington Memorial Hospital.

Dr Aub introduced the topic by briefly reviewing the history of cancer research. He said that, in general, cancer is still an unknown entity. Neither is it known what change in the cells predisposes to cancer, nor is therapy as yet satisfactory. Since the turn of the century, however, a great deal of information has been gathered, as a result of the discovery of x-rays in 1895 and of radium in 1898. The Huntington Hospital was founded in 1899. In 1903 the first successful transplantation of a tumor from animal to animal was achieved. In 1907, Dr Tyzzer established the fact of inheritance of tumors, a most fundamental discovery. In 1911 two Japanese investigators first produced tumors in animals by rubbing tar into the skin. Previous to that it had long been known that chimney sweeps often developed cancer. In 1910 Carrel grew tumors in vitro. Rous and Murphy produced filterable virus tumors in chickens. In 1923 Warburg made his great discoveries, and in 1931 tumors were produced by a crystalline substance derived from tar. This all means that within the last forty years all the techniques or tools necessary for producing and studying tumors have been made available to investigators.

The first paper was presented by Dr I. T. Nathanson on "The Effect of Testosterone on Development and Growth of Spontaneous Mammary Cancer in Female Mice." Spontaneous mammary cancer in female mice has been developed and its incidence standardized by inbreeding of pure strains. Loeb, of St. Louis, castrated such female mice before puberty and thus reduced this incidence. If spayed after puberty the incidence was also decreased, but was not so marked. Lacassagne injected the female sex hormone into mice of both sexes and increased the incidence of mammary cancer. Others have confirmed and extended this work. Recently, Lacassagne injected testosterone into high-cancer female mice, in small doses, and obtained no effect. The author, using larger doses, undertook the same problem. Some 40 mice of approximately the same age and of the same descent were divided into two groups of 20 each. These mice ordinarily develop tumors in six to eleven months after

birth if mated once. One group was given testosterone propionate in 0.5 mg doses in 0.05 cc. of sesame oil three times a week just after the age of four months and after parturition. At the eighth month of age, 6 of the treated mice had developed mammary cancer whereas 11 of the controls had cancer. After the eighth month no more of the testosterone treated mice developed tumors, whereas 100 per cent of the control mice had developed tumors by the twelfth month. At this time mortality due to the testosterone injections per se came into consideration. Ten animals of the treated group were still living, without tumor, at eighteen months of age. All control animals died with tumor by the fourteenth month. Of the treated mice none had more than one tumor, whereas in the control group 12 developed two or more tumors.

An experiment to study the effect of testosterone on the growth of existing tumors was carried out on 48 animals, half of which were used as controls. The mean diameter based on measurements of the tumors in three planes was used for comparison. Doses up to 5 mg per day had no effect on the rate of growth of the tumors.

Histological studies on the experimental material revealed that the effect of testosterone is on the glandular acini and ducts producing a change toward the male type of mammary gland, both in virgin and in pregnant mice. Dr Nathanson concluded by stating that the experimental evidence presented indicated that estrogens are not carcinogenic per se as regards mammary cancer in mice.

The second paper on Tissue Inhibitors was given by Dr A. M. Brues. Individuals on becoming adults have their growth completely inhibited except in emergencies such as the repair of wounds. Cancer does not seem to be controlled in this way. Tissue cultures when liberated from the body grow freely, but the more adult the tissue the longer it takes to shake off the shackles of inhibition. Since the tissues become free of the inhibitory factors, they make good subjects on which to test the inhibiting powers of various substances. Thus, simple saline liver extract is a good tissue growth inhibitor. Dr Subbarow has been able to isolate a substance which is non-toxic but a good inhibitor. This compound is ethanalamine. It has been shown that the extracts do not interfere with tissue metabolism, and embryonic hearts keep on beating in their presence. Dr Brues found that inhibition of growth by amines was much more effective at pH 8 than at pH 7, and that malignant growths flourished in a zone far out on the alkaline side and in high concentrations of the inhibitor, where normal tissue would not survive. Is this because the interior of a tumor cell is more acid than normal? This is likely, but difficult to prove. Various other inhibitors were studied, but the amines described were the only substances capable of so differentiating normal and malignant cells.

Dr William T. Salter presented the third paper on Comparison of Benign and Malignant Tumors. Implanted tumors in animals are now surprisingly uniform and reliable in their transmission. There is also a standard method of producing malignant disease experimentally by this means, and the histological character of tumors so produced is well known. With this for ground work, Dr Salter experimented on tumor immunity. A tumor of well known character and properties was implanted on the tail of a pedigreed mouse from a highly inbred strain. After a time the tail was amputated, and a second implantation of the same stock sarcoma was tried on the mouse's body. Whereas in control animals it takes occurred in practically 100 per cent of cases, in

the "immunized" mice the incidence of body-takes was materially reduced. Besides, in some such mice the implanted malignant tumors became slow growing and less malignant, and in others the growth was benign. The percentage of mitotic figures after administering colchicine was used as a check on the mitotic activity. Theelin, administered subcutaneously, was found to increase this "tumor immunity." Dr. Salter and his collaborators studied the resultant benign and malignant tumors by comparing their respective metabolisms of oxygen, carbohydrate and nitrogen, and could determine no characteristic difference between the artificially "benign" and the malignant sarcomas. Therefore, he concluded that benignancy is a property of the host as well as of the tumor itself.

Dr. Shields Warren talked on "The Contribution of Pathology to Guidance in Radiation Therapy." Radio-resistance and sensitivity have so far been based largely on empirical grounds. As a general rule, the more embryonic the cell type the more radio-sensitive it is, but exceptions are almost as frequent as the cases that follow the rule. It is for that reason that different tumor types have been sorted and classified on a basis of previous experience with respect to radio-sensitivity. However, one has found that in almost all cells the early prophase is the mitotic stage at which sensitivity is greatest. Certain changes take place in irradiated cells: mitosis is arrested or disturbed, later, vacuolization occurs—abnormal cells appear or calcification develops, the Golgi apparatus shows various stages of swelling, with subsequent disintegration or a return to normal, the same changes occur with respect to the mitochondria. A sublethal dose is followed by a tendency to recovery in eighteen to twenty hours. For this reason, radiation once a day is sound therapy. Another fact that has been discovered is that in plant cells the longer the chromosomes the better is the response to radiation, with some exceptions. This may be a good clue to a future classification of tumors for prognostic and therapeutic purposes.

The fifth paper was presented by Dr. Richard Dresser, "Results of Radiation by the Million Volt Machine on Bladder Tumors." The electrostatic belt-conveyor type of supervoltage x-ray machine has been brought to a high degree of mechanical perfection. The wave lengths of the beam at a potential of one million volts are shorter and more penetrating than any x-rays thus far generated for therapeutic purposes. Briefly, the advantages of this type of radiation are fourfold: 20 per cent more radiation can be delivered to the center of the human pelvis than is possible with 200-kilovolt rays, the skin tolerates nearly twice as much million volt radiation, when smaller portals of entry are employed, there is less general reaction on the part of the patient, the amount of radiation delivered to a deep-seated tumor is largely independent of the size of the portal entry. In a series of 24 cases of bladder tumors treated with 200-kilovolt rays, which was recently reviewed in collaboration with Dr. Roger Graves, it was concluded that external radiation by this method was of value only as a palliative measure. Thus far, 57 cases of carcinoma of the bladder have been irradiated by the million volt machine. In round figures, a third of these cases have shown complete regression, a third partial regression and a third no response to treatment. It is believed that the dosage thus far administered is not curative, but a greater palliation has been secured than with other external methods of radiation. In the brief experience of two years, the technique of million volt radiation has of course, been improved.

The sixth and last presentation was by Dr. Grantley W. Taylor, "Surgical Treatment of Cancer of the Lip." Dr.

Taylor stated that the problem in treating cancer of the lip was to decide when to operate on the neck nodes. He did not give any opinion on this score, but merely presented statistics from which one could draw conclusions. The cases reviewed came from the Huntington, Pondville and Massachusetts General hospitals. The first factor considered was the size of the tumor, since it roughly indicated the duration of the disease and the amount of metastasis. Of 93 patients with carcinoma less than 1 cm. in size, 7.5 per cent had positive lymph nodes, and of these last, 57 per cent were cured by radical surgery. Of 328 patients with a tumor 1 to 2 cm. in size, 13 per cent had positive nodes, of which 55 per cent were cured. Of 136 patients with a tumor 2 to 3 cm. in size, 37 per cent had positive nodes, of which 51 per cent were cured. Finally, of 59 patients with a cancer larger than 3 cm., 24 per cent had positive nodes, of which 43 per cent were cured, but this was actually a group favorably selected for surgery. The second factor was the duration of the lesion, but as with all historical data, it is apt to be inaccurate. The third factor was the grade of the carcinoma. Grade 3 tumors had the highest incidence of positive nodes. The fourth factor was the presence and size of the cervical lymph nodes in relation to their actual involvement. Of those with nodes less than 1 cm. in size, 10 per cent were positive on biopsy, of nodes over 2 cm. in size, 91 per cent were positive.

#### SUFFOLK DISTRICT MEDICAL SOCIETY AND NEW ENGLAND PEDIATRIC SOCIETY

On Wednesday, March 29, 1939, at the Boston Medical Library, there was a combined meeting of the Suffolk District Medical Society and the New England Pediatric Society, at which Dr. Albert D. Kaiser of Rochester, New York, spoke on "Significant Facts in the Tonsil Problem in Children." Dr. R. Cannon Eley presided.

In emphasizing the importance of the problem, Dr. Kaiser reminded the audience that the question of the removal of tonsils and adenoids comes up for decision in almost every child before the school age has been passed. For, although nutritional problems, with special emphasis on the vitamins and minerals, have been indicted with increasing frequency in the retardation of growth, the tonsil still receives considerable notoriety. More recently, the vogue for chemotherapy in upper respiratory infections has been holding the spotlight. In the face of this confusion, therefore, it behooves the doctor to know how to evaluate the operation for removal of the tonsils and adenoids in children. Dr. Kaiser bases his conclusions on 4400 cases, equally divided into operated and unoperated groups, and presents his data as answers to commonly asked questions.

Do tonsils have any useful function in a young child? They play a role similar to other lymphoid tissue in regard to drainage of infected foci, as shown by a group of English workers who injected dyes and bacteria into the paranasal sinuses and demonstrated their excretion through the tonsils. This protective mechanism is especially potent under five years of age, when the lymphoid tissue of the pharynx shows its greatest development and when removal of the tonsils increases the incidence of infection, according to Dr. Kaiser's data. Some recent work by the speaker is suggestive that the vitamin C levels of tonsillar tissue and the blood have similar values, and that the numbers of bacteria that can be cultured from the center of the tissue are inversely proportional to the vitamin C content. It is concluded, therefore, that the tonsil does play a protective role of some nature, at least in children under five years of age.

Is the presence of tonsils a handicap to normal development? Unless there is some specific indication for tonsillectomy, no advantage accrues to the operation. Twelve hundred cases which were recommended for removal but failed to undergo surgery showed comparable development to 1200 operated cases, and in general fared as well except for a slight increase in the number of sore throats and rheumatic infections. Furthermore, those patients who had the 'benefits' of tonsillectomy under five years of age showed no definite improvement except in obstructive symptoms, either of deglutition or breathing. Examination ten years later of the two groups showed barely perceptible differences in the size of the tonsils, presumably due to atrophy in the unoperated group. Dr Kaiser concludes from this study, therefore, that no doctor need fear that failure to remove the tonsils is a grave error of omission.

Is the incidence of infection decreased by tonsillectomy over a control group when the preoperative indications are the same? Data based on 4400 cases equally divided indicate that the common complaints are recurrent tonsillitis, head colds, otitis media, cervical adenitis, lower respiratory infections, measles, diphtheria, scarlet fever and rheumatic fever. The only statistically significant improvement in the operated group after ten years is the lowered incidence of tonsillitis, cervical adenitis and rheumatic fever, while the reduction in the number of head colds is suggestive. Laryngitis, bronchitis and pneumonia show a higher incidence in the operated group here as in other studies, but this is probably a reflection on the susceptibility of those chosen for surgical intervention rather than on the procedure itself. One may conclude, however, that tonsillectomy does not protect against the latter infections. Although the operated group shows a statistically insignificant decrease with regard to scarlet fever, there is little doubt but that the course, when the disease is contracted, is smoother and the prognosis more favorable than it is in the unoperated group.

Rheumatic infection constitutes the most debated if not debatable subject. In the first place, it is generally accepted that tonsillectomy is not indicated in a patient with chorea, who becomes worse, if anything, after operation. In regard to the joint and cardiac manifestations, however, there is more hope. For, although the incidence of initial attacks is reduced only 20 per cent or less by removal of the tonsils, the greatest value lies in the reduction in mortality. Thus, those who retained their tonsils had a 13 per cent mortality, while those whose tonsils were removed at the first attack had a 7 per cent death rate and after the first attack one of only 4 per cent. This occurred in the face of no reduction in recurrences. Dr Kaiser interprets these data to mean that some benefit is to be gained by removing tonsils which are subject to repeated infections.

To Dr Kaiser's way of thinking, contraindications to tonsillectomy include such conditions as acute infections, particularly respiratory, pulmonary diseases and blood dyscrasias. He emphasized the importance of refraining from operation during an acute rheumatic episode. There is evidence accumulating which indicates that the polymyelitis season should be avoided, for the high incidence of the bulbar form of this disease in patients who have recently undergone tonsillectomy seems more than mere coincidence.

The speaker's indications for tonsillectomy rest on the compilation of these extensive data, and striking benefits may result when operation is based on proper preoperative indications. In obstructive symptoms one may expect 75 per cent improvement, in sore throats, cervical adenitis and cyclic vomiting, 50 per cent, in recurrent

colds, otitis media and rheumatic infection, 25 per cent, and in asthma, pneumonia, bronchitis and chorea, none. The appearance of the tonsils is not a reliable criterion for operation, for the removal of small, clean looking ones is often as beneficial as that of those which are large, boggy and purulent—provided the indications are otherwise comparable. Probably the most important single factor in determining the advisability of tonsillectomy is an accurate history. Although it is no disgrace to refuse to perform the operation, it should be elected in proper instances.

In opening the discussion, Dr Francis L. Weille warned that Dr Kaiser's data might be widely employed as a basis for the wholesale retention rather than removal of tonsils. Using Dr Kaiser's own statistics on otitis media, Dr Weille stated that, in his opinion, the benefits claimed had been greatly minimized, for although the incidence of this condition normally decreases in the age group between five and fifteen years, the number of cures in the operated group is approximately twice that of the controls, which is most significant.

Dr Kaiser replied that he merely attempted to interpolate the fact that those in the unoperated group were probably progressing satisfactorily whereas the others were more susceptible. In other words, it is practically impossible to obtain biologically equal groups.

Dr Warren R. Sisson asked the following questions: Granted that it is desirable to remove diseased tonsils and retain normal ones, how shall one determine the latter? How can the number of cases unnecessarily operated on be reduced?

Dr Kaiser replied that the definitely pathologic tonsils with expressible pus and cervical adenopathy throughout the winter season present no diagnostic problem. There is no good criterion, however, in border line cases, and the history is still an indispensable asset. The school doctor, on one cursory examination, can express no reliable opinion, although he often does make an indelible impression on a child's mother by such a proclamation.

The problem of reducing the number of superfluous operations lies at least partly in the social system, for the incidence in Buffalo varies from 30 per cent in the poorest public school to 98 per cent in one of the better private schools. This direct relation between tonsillectomy and social status obtains throughout the entire scale, not only there but in other large cities. Neither extreme is probably the correct proportion, unnecessary operations constituting approximately 25 per cent.

Dr Lyman G. Richards asked whether there was any reason why the adenoids should not be spared when there are no specific indications for their removal except as a part of the operative procedure. He added that it has been asserted that they may exert a sparing action, whereas their removal merely stimulates reaccumulation of lymphoid tissue in the nasopharynx.

Dr Kaiser replied that there are no statistics on this important problem, and the conjecture is that it may be wiser not to denude the entire nasopharynx for Nature certainly causes tremendous lymphoid hypertrophy during subsequent infections of that region. The opposite suggestion, of removing only the adenoids, seems logical for recurrent head colds. Comparison of the results in patients with complete and incomplete removal of the pharyngeal lymphoid tissue shows essentially no difference after a ten year period.

Dr Harold G. Tobey said that the importance of the problem in relation to deafness demands more attention. Of the more than 3,000,000 deaf in the country, only 5 per cent of the cases are due to the main congenital causes—otosclerosis and nerve deafness. The adhesive type which

occurs at fifteen to twenty years of age, is undoubtedly associated with repeated closure of the eustachian tube, and otitis media and mastoiditis are not necessarily factors. In view of this important economic loss, the number of operations is no disgrace, and certainly complete removal of lymphoid tissue, especially in the fossa of Rosenmüller, is indicated.

Dr Kaiser said that tonsils and adenoids certainly should be removed in the face of recurrent middle-ear infections or incipient deafness, but that there is no suggestion that such procedure is beneficial prophylactically. Mastoiditis, like sinusitis, has an increased incidence in the operated group. But this does not vitiate the fact that mastoiditis is not necessary for adhesive deafness.

Dr Conrad Wesselhoft added that tonsillectomy more favorably affects the course and sequelae of scarlet fever than statistics suggest. In the first place, about 25 per cent fewer contract the disease, although they may have a sore throat. But more important is the interpretation of the data which seem to indicate that the procedure is of questionable value in preventing the complications of otitis media and mastoiditis. These very conditions are the indications for tonsillectomy, and these same children without operation would show to even worse advantage compared with a so-called control group in which operation was not performed.

To the question as to what were his indications for operation, Dr Kaiser replied that, under five years of age, obstruction and deafness demand intervention, while over five years the indications are recurrent tonsillitis and cervical adenitis, rheumatic fever, cyclic vomiting, and malnutrition when all else has been ruled out.

Dr Charles F. Walcott said that the individual patient cannot be judged by age or any set criteria, and that it is often wise to ask what one would do with one's own child. Advice should always be sought from the family physician, who is well acquainted with the patient and with the reaction during past attacks and during quiescent stages. One examination during one attack is not sufficient for a consulting specialist to make an intelligent decision as to the advisability of a tonsillectomy.

#### ALPHA OMEGA ALPHA

At the Harvard Medical School on April 28, President Donald D. Matson, of the Harvard chapter of Alpha Omega Alpha, presented Dr Eugene M. Landis, assistant professor of medicine at the University of Pennsylvania School of Medicine, who spoke on "The Effects of Kidney Extracts on Blood Pressure."

In introducing his intriguing subject, Dr Landis reminded his audience that results so far obtained in the field of experimental hypertension, while of the highest importance, must still be amplified and extended before clinical application is possible. However, any additions to or improvements in the present knowledge of the etiology and pathogenesis of this distressing and fatal condition will of necessity show the direction for further investigation and treatment. After the conclusion of his humble prelude, this contributor to the field of vascular physiology proceeded to delight his audience with a well organized, well presented and fundamentally sound report on the work being carried on in Philadelphia concerning the physiologic activity of extracts prepared from kidney tissue.

In a short review of the outstanding historical developments in cardiorenal vascular physiology, Dr Landis re-emphasized the well known controversy between the schools which postulate the kidney or the general vascular system as the primary instigator of hypertension. With the

introduction by von Basch of the sphygmomanometer into clinical medicine, it became apparent that abnormally high blood pressures in the absence of clinically significant morphologic changes of the kidneys and arteries were not uncommon. This disease or syndrome has been successively called the prealbuminuric stage of chronic Bright's disease, latent arteriosclerosis, hyperpiesia, presclerosis, hypertensive cardiovascular disease and benign or malignant nephrosclerosis, but the ever-increasing and changing nomenclature has not clarified the underlying problem to any great degree, although it has indicated changing concepts. In Bright's original description of chronic nephritis in 1827, he considered the cardiac hypertrophy to be secondary to the underlying renal disease. This concept, carrying as it did such great prestige, prevailed universally until the introduction of the sphygmomanometer in 1893. In the succeeding years, it occurred to such men as Allbutt and Huchard that the hypertension might lead to general arteriosclerosis and thus affect the kidney secondarily. With newer clinical or pathological observation, theories of pathogenesis have alternated between these views.

In an endeavor to elucidate the nature of essential hypertension it was only natural that a pressor substance should be sought. As early as 1898, it was demonstrated that an extract of rabbit kidney produces an inconstant and temporary increase of blood pressure. Due to the inconsistency of this and subsequent results, interest began to lag, only to be revived by Goldblatt's epochal experiments in 1932, which have practically revolutionized this field. Partial clamping of both renal arteries resulted in maximal and prolonged rise of both systolic and diastolic blood pressures, and further experiments suggested that hypertension is produced by a humoral mechanism. It has been supposed that a substance formed in the ischemic kidney may be responsible, but this substance has never been isolated from, or demonstrated in, the circulating blood.

It became apparent that an improved technic of preparing kidney extracts might confirm the former experiments in this direction. Consequently, Dr Landis and his co-workers embarked on the problem presented herein.

In order properly to interpret the results obtained with any vasopressor substance, it is necessary to understand the fundamental conditions of the circulation in the human hypertensive patient. Prinzmetal and Wilson, as well as Pickering, demonstrated by the plethysmograph that the rate of peripheral blood flow in the forearm remains normal despite greatly increased blood pressure. Furthermore, the response to various thermal and nervous stimuli in hypertension is perfectly normal. There must, therefore, be a generalized increase of peripheral vascular tone and resistance, but with the maintenance of the usual flexibility of tone. In order to determine whether these conditions were met in the experiments, Dr Landis tested the rabbit's ear for surface temperature and pulse amplitude as a measure of peripheral blood flow and vascular tone.

It was found that heated kidney extract and one of its constituent compounds, tyramine, would each raise the blood pressure of the rabbit by approximately 25 to 35 mm of mercury. However, the former showed no effect on the skin temperature or amplitude of pulsations, whereas tyramine induced vasoconstriction and decreased blood flow in the ear. Similar injections of epinephrine, Pitressin, Pituitrin-S, guanidine, methyl guanidine, dimethyl guanidine, ergotoxin and ergotamine produced a comparable rise in the blood pressure but also a decrease of the skin temperature and pulse amplitude. Such substances, therefore, temporarily elevate blood pressure by

a mechanism fundamentally different from that found in human hypertension

It became evident very early in this work by Dr Landis that the technic of preparing the kidney extracts played an important role in the type of reaction noted. With crude, unheated extract, for instance, the blood pressure might rise, fall or show no change. There was always, however, a conspicuous decrease in the peripheral flow. On the other hand, rabbit kidney extracts heated to 55°C for twenty minutes and then filtered, uniformly elevated systolic blood pressure 30 or 45 mm, with a slow onset and a duration of thirty to forty five minutes. Furthermore, there was never decreased peripheral circulation and, in rare instances, even an increased skin temperature was noted. Extracts heated to 60 or 65°C had no significant effect on blood pressure or peripheral blood flow. Since the amount of protein precipitated increases with the degree of heating, there seems to be suggestive evidence that this is an important fraction in producing hypertension. Dr Landis emphasized, however, that although the mechanism of vascular tone prevails as in human hyperpiesia, the blood pressure is maintained only temporarily at its elevated level in these experimental rabbits.

Before determining the effect of this extract on Goldblatt rabbits, it was necessary to ascertain whether vascular flexibility comparable to the normal was preserved in these animals. Measurement of the skin temperature of the ear demonstrated that the hypertensive animal was entirely capable of responding to temperature and nervous stimuli by changes of vascular tone. Having established this fundamental similarity, rabbit kidney extract was injected into Goldblatt rabbits with an immediate and temporarily sustained rise of blood pressure from 120 to 180 mm and with no change in skin temperature or pulse amplitude. The response to this extract, therefore, is obtained regardless of the original base line. And the sensitivity of the hypertensive rabbit is neither more nor less than that of the normal animal, as shown by the same average increase of blood pressure in each instance.

In all these experiments, Dr Landis has used homologous extracts and donors, due to the general unreliability of results from heterologous injections. To determine the distribution of the hypothetical pressor substance in various species, however, some of the latter type of experiments have been carried out. It is necessary to limit heterologous injections to a single attempt because of subsequent acquired sensitivity. By using kidney extracts from man, rabbit, rat, dog and guinea pig and employing the dog, rabbit, rat and guinea pig as recipients, it was determined that this pressor substance is generally distributed but in various amounts. Thus, the rabbit kidney extract gave an average rise of blood pressure of 43 mm, compared with that from man, which caused an average rise of only 4 mm. On the other hand, the greatest reactivity was demonstrated by extracts from the guinea pig and rat, which were almost twice as responsive as those from the dog. These illuminating data may shed light on previously confusing experimental results.

Various investigators have suggested that some relation may exist between the globulin content of the kidney extracts and their hypertensive potency. Dr Landis's statistics, however, do not allow him to agree with this postulate, for extracts from all species of laboratory animals contain similar amounts of globulin but exhibit the varying activities enumerated above. Yet the pressor substance of kidney extracts accompanies the globulin fraction, as demonstrated by experiments involving heat precipitation, ultrafiltration and fractional salting out by ammonium sulfate.

For assay purposes, human kidney extracts are now be-

ing precipitated by half saturated ammonium sulfate, as well as by heat. The potency of the human extract, however, still falls far short of that from the rabbit kidney. Furthermore, clear-cut pressor effects have so far been obtained only with extracts from kidneys of young individuals with severe malignant nephrosclerosis. The number of human cases so tested, however, is still too small to permit definite conclusions.

Dr Landis emphasized the fact that experimental hypertension produced by heated kidney extracts is only partially similar to essential hypertension in the human being, for the elevated blood pressure is only temporarily maintained. The speaker also advised caution in drawing any broad conclusions from studies of pressor substances until their presence and effectiveness in the blood stream have been established beyond doubt.

In summary, Dr Landis again focussed attention on the fundamental dissimilarity between the vascular background of hypertension as produced by the vasoconstrictor drugs on the one hand and suitably heated kidney extract on the other, the latter simulating much more closely the conditions in human hyperpiesia. He said that he believed that these results may point the way for further investigation, but that the 'provocative similarity' between the effects of kidney extracts and the circulating mechanics of clinical hypertension offers, at present, no certain proof of the pathogenesis of hypertension in man.

## NOTICES

### REMOVALS

GEORGE L. TOBEY, JR., M.D., HAROLD G. TOBEY, M.D., CHARLES I. JOHNSON, M.D., LEROY A. SCHALL, M.D., and MERRILL WITTLES, M.D., announce the removal of their offices from 270 Commonwealth Avenue to 403 Commonwealth Avenue, Boston Telephone KENmore 9620

### ANNOUNCEMENT

JAMES HARRISON, M.D., announces the opening of an office at 120 Needham Street (Riverdale), Dedham

## SOCIETY MEETINGS AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JULY 3

#### FRIDAY JULY 7

\*10 a m 12 30 p m Boston Dispensary tumor clinic

#### SATURDAY JULY 8

\*10 a m 12 m Staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Marshall N. Fulton

\*Open to the medical profession

- JUNE 30 — Salem Hospital Tumor Clinic. Page 1058 issue of June 22
- AUGUST 30 SEPTEMBER 2 — Seminar in Physical Therapy Page 857 issue of May 18
- SEPTEMBER — Boston Psychoanalytic Institute. Page 450 issue of September 22 1938
- SEPTEMBER 4-6 — Institute for the Consideration of the Blood and Blood-Forming Organs. Page 941 issue of June 1
- SEPTEMBER 5-8 — American Congress of Physical Therapy Page 857 issue of May 18
- SEPTEMBER 11-15 — American Congress on Obstetrics and Gynecology Page 938 issue of December 8
- SEPTEMBER 14-16 — Biological Photographic Association Page 941 issue of June 1
- SEPTEMBER 15-28 — Pan Pacific Surgical Association Page 863 issue of November 24
- OCTOBER 23 NOVEMBER 3 — New York Academy of Medicine. Page 977 issue of June 8
- FALL, 1939 — Temperature Symposium Page 218 issue of February 2
- DECEMBER 2 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15
- MAY 14 1940 — Pharmacopoeial Convention. Page 894 issue of May 25
- JUNE 7 8 9 1940 — American Board of Obstetrics and G. Page 1019 issue of June 15



## BOOK REVIEWS

*Dysmenorrhoea* Albert A. Davis 254 pp London, New York and Toronto Oxford University Press, 1938 \$4.50

Davis classifies dysmenorrhea as primary and secondary, according to whether the pain starts with the onset of the menstrual life or some years later, but acknowledges that most of those having a definite pathologic cause fall in the latter group. The chief symptom is described as spasmodic and congestive, the latter applying usually to the secondary type. This book is concerned with the primary type of dysmenorrhea.

Under etiology he considers the incidence of the disease, age of onset, severity, and so forth, giving a good review of the present knowledge. He believes the cause of the pain to be muscular contractions of the uterus, going into detail regarding the normal rhythmic cycles of contractions, and that the contractions are excited by chemical stimulation of the nerve endings. The various theories, such as the obstructive, hormonal, expulsion of endometrial plaques, hypoplastic, allergic, hyperesthetic and neurogenic, are considered in detail. He believes that eventually most cases will be proved to lie in the hormonal and neurogenic fields.

Under hormones he describes the stimulating and inhibiting effects of estrogen and progesterone on uterine contractions and is of the opinion that an imbalance will be proved to be the etiologic factor. The pituitary enters the picture by the stimulating effect of prolactin on the ovary and that of pituitrin on the uterine muscle, but he says the degree of their influence has not been decided. He can find no evidence of participation by the thyroid, parathyroid, thymus and adrenal glands. Fifty-five pages are devoted to the neurogenic theory, with a description of the anatomy of the autonomic and somatic nerve supply to the uterus and a discussion of the functions of the different systems regarding which there is a great difference of opinion. He describes inflammatory changes in the ganglion cells of the sympathetic system, which he thinks are characteristic in primary dysmenorrhea and occur in three quarters of the cases. He concludes that "The pain may be due to exaggeration of either motor or sensory impulses by a nerve rendered hypersensitive through inflammation."

There are good chapters on membranous, secondary and intermenstrual dysmenorrhea.

Under treatment the various constitutional measures, exercises and drugs are first considered. The drugs are taken up in detail, and the various proprietary products studied. He believes that organotherapy is very disappointing, but should be tried, especially the anterior pituitary, the hormone and small doses of thyroid extract. Alcohol injection into the nerve plexuses on each side of the pelvis where the various uterine nerves come together is described in detail, and 60 per cent of good results reported, but not the number of cases treated. Dilatation of the cervix is a valuable adjunct to other methods, but the use of tents and stem pessaries is condemned. The technic of presacral neurectomy is well described, as well as its difficulties and dangers. He finds that 75 per cent are cured and the rest much relieved, and recommends that it be reserved for failures after simpler types of treatment.

There is a bibliography of 28 pages.

This is a sensible, well-written book which would be more convincing if series of cases were tabulated for each of the chapters, however, it gives a complete picture of the subject.

*Principles of Hematology* Russell L. Haden. 348 pp Philadelphia Lea & Febiger, 1939 \$4.50

For a long time, there were no American texts on hematology. In the last few years, there has been a bumper crop, and almost every hematologist of note has contributed his opus—Castle and Minot, Downey, Os-good, Kracke, Sturgis and Isaacs, Murphy and, now, Haden. Some say, rather cynically, that textbook writing in any field is a sure sign of its approaching decadence. In the feverish decade of activity in hematology, dating from 1926, textbooks were scarce, although advances were many. Is the order now to be reversed? The monumental *Handbook of Hematology* edited by Downey, is undoubtedly the most erudite American work in this field, and serves only a limited audience. Haden's book, on the other hand, is aimed quite frankly at the much larger field which includes the general practitioner. The wealth of illustrations is perhaps the outstanding feature of the book. Although no colored lithographic plates are present, the photographs are mostly carefully selected and excellently executed, they actually illustrate. Unless one customarily thinks in visual terms, as the author apparently does, some of the numerous diagrams may on occasion be confusing. One may question the wisdom of illustrating even the smallest point by a mechanistic diagram.

Surrounding this mass of illustrations is a rather small amount of text. Probably in the interests of simplicity, the wording is often quite dogmatic, and controversial subjects are dismissed with a few words. The reader's interest, however practical it may be, is rarely stimulated to go a little more deeply into a given subject. (The entire bibliography consists of thirty-nine references.)

The several chapters on methods, on granulocytes and their reactions, and on the treatment of anemia and polycythemia are good. The chapter on the mechanism of anemia and polycythemia might be improved if some of the many diagrams were omitted. Far too much attention seems to be paid to the volume and saturation indices, rarely used by the general practitioner. The statement that small transfusions are valuable for a stimulating effect on the bone marrow is to be doubted. Bone marrow biopsy—whether by trephine or puncture—is neither described nor discussed. Despite their widespread use there is very little on transfusions or blood storage and nothing regarding methods of blood typing. The heterophil agglutination test for infectious mononucleosis is dismissed with a simple mention, and this important disease is considered in only one of the one hundred case reports given at the end of the book. There is no mention of vitamin K and its relation to prothrombin.

Despite its deficiencies, the book will probably prove to be popular with the general practitioner desiring an introduction to hematology. The illustrative cases are well selected and without question a valuable feature. The book undoubtedly represents a sincere attempt to educate the average physician, and for this it should be commended.

*Infections of the Hand: A guide to the surgical treatment of acute and chronic suppurative processes in the fingers, hand and forearm* Allen B. Kanavel. Seventh edition. 503 pp Philadelphia Lea & Febiger, 1939 \$6.00

It is a sad privilege to review this seventh edition of the late Dr. Kanavel's classic work. The publishers note should be read. The volume is more compact than the sixth edition. The type, the number of chapters and the chapter headings are the same. Changes in phraseology have been

made throughout. Some chapters have been condensed and others expanded. A half dozen illustrations have been omitted, another half dozen altered, and fully twenty new ones introduced. Nevertheless the new edition is shorter by forty pages.

An oblique, rather than a vertical, incision through the radial border of the palm is described for drainage of the thenar space. A more or less transverse incision, often directly along the distal flexion crease, is being used for draining the middle palmar space, rather than the earlier vertical incision. Roentgen irradiation in therapeutic doses in the early stages of infection has been found of value since the publication of the sixth edition. A considerable addition has been made concerning the treatment of chronic undermining burrowing ulcers with zinc peroxide, after the method of Meleney. Only cautious references are made to the use of sulfanilamide as an adjunct to surgery. This is consistent with Dr Kanavel's purpose that all the editions of his monograph be safe and sound guides for the practitioner. His life was cut short before the scientific control of the administration of the drug had been developed.

The exposition of the anatomy of the palm is fundamentally the same as in the sixth edition: a radial bursa connected with the flexor pollicis longus sheath, a thenar space into which drain the flexor tendon sheath and the lumbrical canal of the index finger, an ulnar bursa into which usually drains the flexor sheath of the little finger, and separate from it a middle palmar space into which usually drain the remaining flexor sheaths and lumbrical canals. Although some students of the hand have not been in entire agreement with this arrangement of the palmar structures a recent study from the Department of Anatomy and Surgery at Western Reserve University School of Medicine has challenged the identity of a middle palmar space and demonstrated an adductor space unassociated with the tendon sheath and lumbrical canal of the index finger.

In the foreword of this work Dr T Wingate Todd writes: "To both Dr Brickel and myself it is a matter of deepest dismay that at the very moment when we should have wished to consult with Dr Kanavel on this important work Fate intervened and left us to carry on without his constructive criticism and approval."

Dr Kanavel's monograph is a classic work on hand infections and since its first appearance in 1912 has doubtless contributed more than any other to the intelligent treatment of this heretofore sadly neglected field of surgery.

*Surgical Treatment of Hand and Forearm Infections*  
A C J Brickel 300 pp St. Louis C V Mosby Co., 1939 \$7.50

This carefully prepared monograph comes from the Department of Anatomy and Surgery of Western Reserve University. The foreword by T Wingate Todd should be read.

The work may be divided into two parts, anatomical and clinical. The clinical considerations concern chiefly the regional surgery of the usual pyogenic infections. To these are added the management of specific infections and human bites, the influence of diabetes and peripheral vascular disease, and the medicolegal aspects of hand injuries.

The anatomical text consists of descriptions of 14 excellent plates (10 in color). The clinical significance of the structural arrangement is epitomized in notes at the end of each description. The usual and occasional extent and relations of bursas and spaces are further set forth in the description of 17 plates and a diagram of roentgenograms

of radiopaque injections. The whole is beautifully done. The generally accepted concept of a thenar space, into which projects the flexor tendon sheath of the index finger, separated from a mid palmar space by a septum along the third metacarpal, is not confirmed by Brickel's findings. His studies show that the proximal portion of the palmar cavity is a common space which is usually filled by the ulnar bursa and its enclosed tendons and that it is continuous with a distal portion which is divided into compartments by septums separating the lumbrical canals and the tendon sheaths. Each lumbrical canal is connected distally with a web space but proximally with the common synovial cavity. The radial and ulnar bursas are usually separated, but in some hands there is a communication between them. This may be valve-like in character, thus preventing the spread of pus from one to the other, but on decompression by drainage of the infected bursa the effectiveness of this barrier may be lost. The term, thenar space, is discarded for the more descriptive term, adductor space, anterior and posterior.

Although the author emphasizes the necessity of making lateral drainage incisions in the fingers dorsal to the digital vessels and although he quite properly insists that drainage material must not press against the tendons or pass beneath them, he unfortunately does not describe the intimate blood supply of the tendons themselves. Mesotenons are neither mentioned nor illustrated. Although it is stated that the use of 70 or 80 gr of sulfanilamide in divided doses each day for four days has been found of great benefit in cases of streptococcal and staphylococcal infections as an adjunct to surgery and although caution against individual susceptibility and the coincident employment of external or internal sulfates is advised, no detailed information concerning the scientific control of its administration is given.

This monograph is a valuable contribution to the subject. To a student of the hand it is fascinating. Certain anatomical features which it presents should stimulate further investigation of this economically important member of the body. The book should be carefully studied by all general surgeons and practitioners who undertake the treatment of hand infections.

*Immunity Principles and application in medicine and public health* Hans Zinsser, John F Enders and LeRoy D Fothergill Fifth edition 801 pp New York The Macmillan Co., 1939 \$6.50

The present edition enlarges the scope of the usefulness of this book. It has been written to reach a much larger group of readers than the former editions, and by the elimination of much of the older material and by the detailed discussion in Section II of the application of immunological knowledge to medicine and public health, it has become a volume which might well be placed in the library of every physician.

In Section I the authors discuss the general principles of immunology in such chapters as "Infection and Virulence," "Toxin-Antitoxin Reactions," "The Basis of Immunity," "Iso-antibodies and the Blood Groups," "Hypersensitiveness," and so forth.

In Section II the immunological problems in individual infections are discussed. Among these are chapters on virus diseases, diphtheria, scarlet fever, other hemolytic streptococcal infections, staphylococcal infections, pneumonia, whooping cough, syphilis and tuberculosis.

The writers' thorough understanding of the subject and gift at expressing this knowledge make the mental transference of this information to the reader an exhilarating experience.

